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APHIDIDAE OF FORMOSA

PART 3

BY

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APHIDIDAE OF FORMOSA.—3.

By

RYOICHI TAKAHASHI

Introduction

The present paper is a continuation of the author's studies published as part one (Agricultural Experiment Station, Formosa, Report No. 20, 1921) and part two (Government Research Institute, Department of Agriculture, Formosa, Report No. 4, 1923) under this general title.

The study of the immature stages of Aphididae has been practically neglected, and in the present report the author has presented the results of his studies on the nymphs of these insects, and also will describe certain species from Formosa, as well as others from Japan. Moreover, notes on certain species and keys for the identification of the nymphal instars are given. The species which are added in this paper to the aphid-fauna of our island are as follows:

Macrosiphum smilacicola n. sp.
M. *perillae* n. sp.
M. *spp.*
Myzus varians Davidson.
M. *plantagineus* Pass?
Capitophorus braggii Gillette.
C. *sp.*
Aphis petasiticola n. sp.
Anuraphis artemisiae n. sp.
Hyalopterus chenopodii Schrank.
Greenidea tenuicorpus Okajima.
Myzocallis formosanus n. sp.
Dilachnus formosanus n. sp.
Unilachnus orientalis n. sp.
Aiceona osugii n. sp.
Eriosoma clematicola n. sp.

Oregma formosana n. sp.
O. oplismeni n. sp.
O. koshunensis n. sp.
O. alexanderi n. sp.
O. pseudomontana n. sp.
Cerataphis formosanus n. sp.

The *Macrosiphum spp.* seem to be new to science, but the author hesitates to give new names to them, since their winged forms have never been collected. The new Japanese species dealt with in the present paper are *Macrosiphum esakii, M. smilaceti, Myzus rhois, Patchia spiraeae* and *Oregma japonica.*

The results of further studies will be published in the fourth report of this series of papers. The type specimens are preserved in the collection of the entomological laboratory of this Department. All the drawings accompanying this paper were made by the author.

The author wishes to express his sincere thanks to Dr. T. Shiraki, Chief of the Section of Economic Zoology of this Department, for his kind help in completing this report. The author is greatly indebted to Prof. Dr. C. P. Alexander of the United States of America for his kindness in correcting many errors in English in the manuscript of this paper, and *Oregma alexanderi* n. sp. is dedicated to him.

The author must express his hearty thanks to Prof. Niijima and Messrs. Kuwayama, Esaki, Hori, Yokoyama, Kishida, Takeuchi, Kurisaki, Uye, and others for the valuable aphid material sent to him. Lastly the author expresses his most cordial thanks to the Hon. Prof. Dr. K. Oshima, Director of the Department of Agriculture, Gevernment Research Institute, for his kindness in publishing this paper.

Notes on the morphology of the nymphs of Aphidinae.

Ecdysis

The aphids, whether winged or wingless, usually moult four times before reaching maturity and, as a rule, have four nymphal instars, but there are certain exceptions to this. Davis records a case where an apterous form of *Aphis maidiradicis* Forbes gave birth to six young, then moulted, became winged and produced twenty-one more young. According to Haviland, *Myzus ribis* L. sometimes shows

a fifth moult subsequent to the birth of young; and it has been stated that a fifth moult has likewise been noticed exceptionally in *Macrosiphum pisi* Kalt. Monzen observed that a moult took place after the birth of young in *Eriosoma lanigera* Hausm. The moulting after sexual maturity observed in some Aphididae is also known in Collembola, but not in any other order of insects.

Moreover it is very remarkable that, unlike all other groups of insects, Aphididae, as well as Collembola, are not provided with malpighian vessels. This is in support of the theory that ecdysis perhaps has an excretory importance besides being a provision for growth.

Ewing obtained paedogenetic nymphs, as he designated them, of *Rhopalosiphum avenae* Fab., but as pointed out by Baker, these proved to be intermediates, adults between the winged and wingless condition.

Paedogenesis has not been found in Aphididae. The number of moults is few in the sexes of *Pemphigus, Tetraneura, Eriosoma* and others, as well as in the males of *Stomaphis.* These sexual forms are always apterous, with the rostrum rudimentary.

I have found that the wingless forms of the genera *Oregma* and *Astegopteryx* moult only three times, while their winged forms moult four times as is usual in the family. The apterous forms of *Lachnus thujafoliae* Theob. likewise seem to have three nymphal instars. Pergande records three moults for the apterous forms and four moults for the winged forms in *Hormaphis hamamelidis* Fitch and *Hamamelistes spinosus* Shimer.

According to Fuller, the apterous workers and soldiers of a termite community pass through fewer stages of growth than do their corresponding winged imagoes. Certain apterous species of Gerridae and Veliidae have been recorded as having three or four nymphal instars, although five instars is the common number for Heteropterous insects. In the author's opinion these facts indicate that the apterous forms of paurometabolous insects show a tendency to moult fewer times than do the winged forms. This is perhaps due to the simplicity of structure of the body in the apterous forms.

Morphology of the nymphs, with special reference to their metamorphosis.

As is well known, the postembryonic development of Aphididae is paurometabolous and, as in many other groups of paurometabolous insects, the structural

differences between the young and fully-grown nymphs are more distinct than those between the latter and the adults, especially so in the apterous forms.

Each of the nymphal instars usually displays structural characters sufficient for the identification of the particular instar that it represents, but the third and fourth instars of the apterous form are scarcely different in structure in *Greenidea, Dilachnus* and *Shivaphis celti* Das.

(Aleyrodiform females of Hormaphidina)

Since the metamorphosis of the aleyrodiform females of some genera of Hormaphidina, as *Astegopteryx, Hamamelistes* and *Hormaphis,* is very peculiar, it will be considered first.

The adults are very hard-bodied, almost black and aleyrodiform, being cemented to their hosts. In the first instar, the nymphs are active, crawling over the host. They are pale in colour, since the impregnation of chitin is much lighter than in the adult, and are provided with well-developed legs and antennae, the latter 3 or 4- jointed. In the second instar, they become stationary, with the antennae rudimentary, 2 or 3-jointed; the front and middle pairs of legs without tarsi; the hind legs provided with one-jointed tarsi, without claws. In the third or last instar, the body becomes broader, the antennae more rudimentary, the legs remaining almost as in the preceding instar. This metamorphosis resembles that of some female Coccidae.

(Other Aphidinae)

In the young nymphs, the body is often rather flattened, with the abdomen narrow. In the dimorphs or the first instar specialized for aestivation of *Periphyllus,* it is quite depressed and thin.

In proportion to the size of body, the head is larger in the young nymphs than in the grown ones or adults. It is completely fused with the pronotum in *Cerataphis, Oregma, Astegopteryx, Aleurodaphis, Cervaphis, Neophyllaphis, Greenidea* and others, except in the fully grown nymphs and adults of the winged form. The dorsal surface of the head of *Lachnus* or *Eulachnus* is divided, though not distinctly so, by a longitudinal line, visible even in the first instar. In the nymphs of *Neophyllaphis podocarpi* Takah., it is likewise divided, though scarcely so in the adults. In *Oregma* and *Cerataphis,* a pair of horns is present on the front, even in the first instar.

They are usually larger in the nymphal stages than in the winged adults. In *Oregma bambusifoliae* Takah., the apices of these horns are rather pointed in the

first instar, though rounded in the later instars. *Astegopteryx styracicola* Takah., as well as *A. styracophila* Karsch, is provided with some short setae on the front of head, which occur likewise in the wingless adults, but not in the winged adults.

The frontal or antennal tubercles are absent in the young nymphs, gradually developing, however, with the moults and are distinct in the fully-grown nymphs, in the genera *Macrosiphum* and *Amphorophora.* In the genera *Phorodon* and *Akkaia,* however, they are distinct, all the instars being provided on the inner side with a tubercle which is smaller than that of the adult; in the genus *Myzus* they are very short, but distinctly gibbous on the inner side, even in the first instar.

The eyes are smaller than those of the adults and are usually less protuberant in the younger instars, but in *Eulachnus* they are distinctly protruding even in the first instar. They are composed of three facets in the genera *Oregma, Cerataphis, Astegopteryx, Neophyllaphis, Cervaphis* and allies, excepting in the fully-grown nymphs of the winged form where they are composed of numerous facets as in the winged adults. In the first instar, the ocular tubercles are usually not visible, but in many species three facets on the posterior portion of the eye are larger than the remaining fecets. However, in *Rhopalosiphum nymphaeae* L., as well as in *Shivaphis celti* Das, they are visible even in the first instar. These ocular tubercles gradually become more distinct with growth. The facets on the ocular tubercles are always three in number, and no aphid has yet been found, in which the eyes are composed of fewer than three facets. In my opinion, the three facets of the degenerated eyes of the apterous forms and most nymphal instars of *Oregma, Cerataphis, Astegopteryx, Cervaphis, Neophyllaphis* and others correspond to the facets on the ocular tubecles of many species. The ocelli are always lacking during nymphal life.

The rostrum is longer in proportion to the length of body in the young nymphs than in the grown ones or adults, especially so in the Lachnina, sometimes reaching beyond the end of the abdomen, as in the first instar of *Pterochlorus.* The sexes of *Pemphigus* and others, as well as the males of *Stomaphis,* are provided with a rudimentary rostrum in the nymphal stages, but this is not used for feeding, as in the adults.

The antennae are shorter, stouter and less imbricated than in the adults. In the winged forms of *Astegopteryx,* in the first instar they are rather slender, imbricated and capable of active movement, in the later instars, becoming quite stout, not imbricated and scarcely movable, being appressed to the side of the head. The antennae are sometimes as many jointed throughout all the nymphal instars as in

the adults, but usually are fewer-jointed in the young nymphs than in the grown ones or adults. In the first instar they are usually 4 or 5, rarely 3, but never 6-jointed. According to Davis, the first instar of the first generation of *Macrosiphum pisi* Kalt. has the antennae fewer-jointed than in the corresponding instar of other generations. In the fully-grown nymphs they usually have as many joints as in the adults. The mode of joint-multiplication is the same in all species. The new joint is derived from the third joint, not from others, and only one joint may be added at any one moult from the first to the fourth, as shown by the accompanying table. Each joint of each instar is usually longer than the corresponding joint of the preceding instar, but the third joint of the second or third instar is sometimes shorter than that of the preceding. The basal two joints are always very short and stout as in the adults; they correspond to the scape, and the remaining joints to the flagellum, in other insects. The first joint, in the genus *Neophorodon*, is furnished with a tubercle, smaller than those of the adults, on the inner side. The third joint is destitute of hairs in the first instar, but is provided with them in the later, in the genus *Macrosiphum*. The secondary sensoria are almost always absent in the immature stages, but the grown nymphs of some *Dilachnus, Lachnus* and *Eulachnus* are furnished with a few such sensoria on the fourth or fifth joints. Each of the last two joints is always provided with a primary sensorium, which in some species is surrounded by a row of hairs. Even in the first instar the last joint is also provided with some smaller sensoria situated in a group beside the primary sensorium; the filament or spur is as in the adults.

The thorax is very simple in structure, since no sclerites are distinguishable even in the mesonotum of the fully-grown nymphs of the winged form. In *Oregma, Cerataphis, Astegopteryx, Aleurodaphis, Neophyllaphis, Cervaphis, Greenidea* and others, as already mentioned, the pronotum and the head are usually defined in the fourth instar and adults of the winged form, but they are fused together in other instars of it, as well as in all the stages of the wingless form.

In the genera *Aphis* and *Rhopalosiphum*, the prothorax is furnished with a small lateral tubercle even in the first instar. In the third instar, the mesothorax of the winged form begins to develop, protruding laterally, becoming larger, with the wing-pads well-developed in the fourth instar.

The wing-pads are usually dusky or pale greenish in colour, always without hairs and wax-pores, and are placed close to the sides of the thorax, especially in the Callipterina. The hind pair of pads is always smaller, being completely covered by

the fore pads in the fourth instar.

The legs are shorter and stouter than in the adults, with the tarsi 2-jointed and furnished with two claws. The first tarsal joint is smaller than the second, as in the adults. In some Callipterina, the limpid empodial hairs are present even in the young nymphs, as in the grown nymphs and adults. Even in the youmg nymphs, certain Hormaphidina are furnished with some very long capitate hairs on the tarsi which are sometimes imbricated.

In *Periphyllus*, the hind pair of tibiae is provided with some bristles arranged nearly in a single row in the young nymphs, but with these much numerous and not in a single row in the grown ones. The front and middle pairs of tibiae of the dimorphs are not provided with normal hairs, but with lamellae.

The abdomen becomes larger, as the growth proceeds. The lateral tubercles are visible even in the first instar in *Rhopalosiphum* and *Aphis*, while the dorsal ones, which are very prominent in the winged adults, are not recognizable in the nymphal stages in *Myzocallis pseudoalni* Takah. or in *Callipterus kahawaluokalani* Kirk. In *Cervaphis*, the abdomen, as well as the head and thorax, is provided with long projections, which are branched in the grown nymphs, as well as in the adults, but not in the first instar. *Cavariella* is furnished with a tubercle above the cauda much shorter than that of the adult, even in the first instar, while in *Greenidea* each of the seventh and eighth abdominal segments of the first instar is armed with a pair of tubercles which entirely disappear with the first moult.

The dorsal tubercles on the seventh and eighth abdominal segments of the genus *Akkaia* are very distinct even in the young nymphs, being as large as or larger than those of the adults. *Setaphis viridis* v. d. Goot is furnished with a pair of sharply pointed horns on the abdomen as in the adults.

The cornicles are shorter, stouter and less-imbricated than in the adults, never being reticulated, and are markedly shorter in the younger instars. In *Amphorophora* the cornicles are less dilated in the young nymphs than in the grown ones or adults. *Rhopalosiphum nymphaeae* L. possesses somewhat dilated cornicles even in the first instar. The cornicles of the nymphs are almost similar in shape,but usually smaller than those of the adults in *Akkaia*, Lachnina, some Callipterina and Hormaphidina and others. But in *Chromaphis carpinicola* Takah., the cornicles of the fully-grown nymphs are larger than those of the winged adults. In *Dilachnus, Lachnus* and *Pterochlorus*, the cornicles are situated on the cones which are shorter than those of the grown nymphs and are entirely or nearly destitute of hairs in the

first instar, but are hairy in the second and the following instars.

In some Hormaphidina, the cornicles are absent in the first instar, appearing, however, with the first moult. In the first instar of *Greenidea*, they are very peculiar in structure, being conical in shape, not imbricated and without hairs, and are merely tubercles in shape, but with the first moult they become elongate and hairy. In *Cervaphis*, *Greenidea* and *Trichosiphonaphis*, they are provided with hairs even in the nymphs, excepting in the first instars of the two former genera. These hairs of the winged adults of *Trichosiphonaphis* are not capitate unlike those of the nymphs.

The cauda is usually shorter, stouter and less hairy than in the adults, more especially so in the younger nymphs, and is never constricted at the base or at midlength. It is often wider than long, but is sometimes as long as wide in the grown nymphs of some Aphidina and is longer than wide in the fourth instar of *Macrosiphum*. When seen from above, it is almost triangular in shape, with the apex rounded, or the hind margin may be broadly rounded, sometimes being almost semicircular in outline. In *Myzocallis* and some other genera of Callipterina, throughout all the nymphal instars, it is destitute of hairs, with the hind margin broadly rounded.

The anal plate is very simple, never bilobed and usually not sinuous, but in *Greenidea* it is somewhat sinuous even in the first instar. In *Akkaia* it is not well developed in the nymphs.

The genital opening is not visible in the nymphs.

The spiracles are similar to those of the adults in number and distribution, sometimes slighly protuberant.

The hairs on the body and its appendages are usually fewer in number in the young nymphs than in the grown ones and adults. In some species of *Periphyllus*, the dimorphs are provided with very peculiar hairs or "lamellae" The nymphs of the winged form of *Chromaphis carpinicola* Takah. are furnished with many bristles, these being stouter and longer than those of the adults.

In some *Myzocallis*, *Myzus*, *Neophorodon*, *Trichosiphonaphis* and *Capitophorus*, the nymphs of both the apterous or winged forms are furnished with many capitate hairs as in the wingless adults, while the winged adults lack these hairs and are provided with normal ones. In some species the wax-pores are as well developed even in the first instar of the winged and wingless forms as in the wingless adults. They are present in the winged adults of *Slivaphis celti* Das, but not in those of Hormaphidina. In *Oregma bambusifoliae* Takah., as well as in *O. bambusicola* Takah., the wax-pores of all the instars of both the winged and wingless forms scarcely differ from those of the apterous adults in number, shape and distribution, but in some other species they differ distinctly. In *Oregma panicola* Takah., the wax-pores are very small, and scattered over the head and thorax, being absent on the abdomen in the grown nymphs of the winged form, while they are larger, circular and distributed as in *Oregma montana* v. d. Goot in the nymphs of the wingless form. In *Astegopteryx* and some species of Hormaphidina, the nymphs of the apterous form have many wax-pores arranged in a single row around the whole margin of the body, while those of the winged form possess much more wax-pores in groups on the dorsum, throughout all the instars.

Number of the antennal joints.

In giving the number of joints of the antennae, the author, of course, has not counted the filament or spur of the last joint as a separate and distinct joint.

(Abbreviations used in the following table)

A. v. ♀—Apterous viviparous female.
F. ——— Fundatrix or stem-mother.
O. ♀ — Oviparous female.
W. v. ♀ —Winged viviparous female.
V. ♀ — Viviparous female, both winged and wingless.

Species	Form	Number of antennal joints					Investigator
		Nymph.				Adult	
		1st instar	2nd	3rd	4th		
Macrosiphum formosanum Takah.	V. ♀	5	5	6	6	6	Takahashi
M. gobonis Mats.	Do.	5	5	6	6	6	Do.
M. neoartemisiae Takah.	Do.	5	5	6	6	6	Do.
M. pisi Kalt.	F.	4	?	?	?	6	Davis
Do.	V. ♀	5	5	6	6	6	Do.
M. illinoiensis Shim.	F.	3	4 or 5	5	5	5	Baker
Do.	V. ♀	?	?	?	6	6	Do.
Do.	O. ♀	4	4	5	5	6	Do.
Myzus tropicalis Takah.	V. ♀	4	5	5 or 6	6	6	Takahashi
M. plantagineus Pass?	Do.	5	?	?	6	6	Do.
Neophorodon rubi Takah.	Do.	4	?	?	?	6	Do.
Akkaia polygoni Takah.	Do.	4	?	?	5	5	Do.
Amphorophora indica v. d. Goot.	F.	5	5	5	5	5	Do.

Species	Form	Number of antennal jointa					Investigator
		Nymph.				Adult	
		1st instar	2nd	3rd	4th		
Do.	V. ♀	5	5	6	6	6	Do.
A. oleraceae v. d. Goot.	Do.	4	5	6	6	6	Do.
Cavariella neocapreae Takah.	Do.	4	5	5	5	5	Do.
Rhopalosiphum avenae Fab.	Do.	4	?	?	?	5or6	Do.
R. nymphaeae L.	Do.	4	5	5or6	5or6	6	Do.
Toxoptera nigra Baker.	O. ♀	4	5	5	6	6	Baker
Toxoptera muhlenbergiae P. et D.	F.	4	5	5	5or6	6	Phillips
Aphis malvoides v. d. Goot.	V. ♀	4	5	6	6	6	Takahashi
A. sambuci L.	Do.	4	5	5or6	6	6	Do.
A somei Essig et Kuw.	Do.	4	5	?	6	6	Do.
A. maidis Fitch.	Do.	4	4	5	5	6	Davis.
A. pomi De Geer.	F.	4	5	5	5	5	Baker and Turner
Do.	V. ♀	4	5	5	6	6	Do.
Do.	Sex	4	5	5	6	6	Do.
A. houghtonensis Troop.	A. V. ♀	4	4	5	6	6	Baker.
A. maidi-radicis Forbes.	V. ♀	4?	5	5	5	6	Davis.
A. sorbi Kalt.	F.	4	4	5	6	6	Matheson.
Do.	V. ♀	?	?	6	6	6	Do.
A. malifoliae Fitch	F.	4	5	5or6	6	6	Baker and Turner
Do.	V. ♀	4	5	6	6	6	Do.
Anuraphis helichrysi Kalt	Do.	?	?	?	6	6	Takahashi
Hyalopterus pruni Fab	F.	5	5	5	5	5	Davidson
Do.	V. ♀	5	?	?	?	6	Do.
H. chenopodii Schrank.	Do.	?	?	?	6	6	Takahashi
Brachycolus heraclei Takah.	Do.	4or5	5	?	6	6	Do.
Brachysiphoniella gramini Takah.	Do.	?	?	?	6	6	Do.
Cryptosiphum artemisiae Buckt.	Do.	?	?	?	6	6	Do.
Greenidea kuwanai Perg.	Do.	5	5or6	6	6	6	Do.
G. formosana Maki.	Do.	5	5or6	6	6	6	Do.
Cervaphis quercus Takah.	A. V. ♀	4	4	4	4	4	Do.
Do.	W. V. ♀	4	4	4	4	5	Do.
Myzocallis pseudoalni Takah.	Do.	4	5	6	6	6	Do.
Callipterus kahawaluokalani Kirk.	Do.	4	5	6	6	6	Do.
Chromaphis juglandicola Kalt.	Do.	3	3	4	5	6	Davidson
Do.	Sex	?	?	?	6	6	Do.
Shivaphis celti Das.	V. ♀	5	5	6	6	6	Takahashi
Neophyllaphis podocarpi Takah.	Do.	4	5	6	6	6	Do.

Species	Form	Number of antennal joints					Investigator
		Nymph.				Adult	
		1st instar	2nd	3rd	4th		
Chaitophorus sp. on *Populus sp.*	Do.	4	5	?	6	6	Do.
Periphyllus acerifoliae Takah.	Do.	4	5	6	6	6	Do.
Do.	F.	4	5	5	5	5	Do.
Sipha flava Forbes.	V. ♀	4	4	4	4	5	Davis
Dilachnus piniformosanus Takah.	V. ♀	4	5	6	6	6	Takahashi
D. formosanus n. sp.	Do.	4	5	6	6	6	Do.
D. pinidensiflorae Essig.	Do.	4	5	6	6	6	Do.
Lachnus laricis Walk.	Do.	4	?	?	6	6	Do.
L. thujafoliae Theob.	Do.	4	5	6	6	6	Do.
Pterochlorus tropicalis v. d. Goot.	Do.	5	?	?	6	6	Do.
Eulachnus piniformosanus Takah.	Do.	4	5	6	6	6	Do.
Nippolachnus piri Mats.	Do.	?	?	?	6	6	Do.
Stomaphis quercus L.	Do.	5	6	6	6	6	Do.
Oregma bambusifoliae Takah.	A. V. ♀	4	4	4	—	4or5	Do.
Do.	W. V. ♀	4	4	5	5	5	Do.
O. panicola Takah.	Do.	?	?	?	5	5	Do.
O. bambusicola Takah.	Do.	4	?	?	5	5	Do.
Cerataphis lataniae Boisd.	V. ♀	4	?	?	?	4or5	Do.
Astegopteryx quercicola Takah.	A. V. ♀	3	2	1	—	1	Do.
Do.	W. V. ♀	3or4	5	5	5	5	Do.
A. fici Takah.	A. V. ♀	3	?	?	—	?	Do.
Do.	W. V. ♀	4	?	?	5	5	Do.
A. cuspidatae Essig. et Kuw.	A. V. ♀	?	?	?	—	3	Do.
Do.	W. V. ♀	?	?	5	5	5	Do.
A. styracicola Takah.	Do.	?	?	?	5	5	Do.
A. styracophila Karsch.	Do.	?	?	?	5	5	Do.
Aleurodaphis blumeae v. d. Goot.	A. V. ♀	4	4	4	—	4or5	Do.
Do.	W. V. ♀	4	?	?	5	5	Do.
Hamamelistes spinosus Shim.	F.	4	4	4	—	4	Pergande
Do.	A. V. ♀	4	3	3	—	2or3	Do.
Do.	W. V. ♀	4	5	5	5	5	Do.
H. betulae	A. V. ♀	4	4	4	4	5	Tullgren
Hormaphis hamamelidis Fitch.	F.	3	3	3	—	3	Pergande
Do.	A. V. ♀	3	2or3	1	—	1or2	Do.
Do.	W. V. ♀	3	3	3	3	3	Do.
A Hormaphid on *Populus sp.*	Do.	3	3	3	3	4	Takahashi
Tetraneura sp. on *Ulmus sp.*	Do.	5	5	6	6	6	Do.

Species	Form	Number of antennal joints					Investigator
		Nymph.				Adult	
		1st instar	2nd	3rd	4th		
Eriosoma lanigera Hausm.	A. V. ♀	5	5	5or6	6	6	Baker
Prociphylus pyri Fitch.	W. V. ♀	?	?	?	6	6	Takahashi

Differences between the winged and wingless forms in the nymphs.

In the first and second instars, the nymphs of the winged form usually do not differ from the corresponding stages of the wingless form, but in the third and fourth instars they always differ structurally.

However, as already stated, in some species of Hormaphidina, the nymphs of the winged form even in the first instar are distinctly different from those of the wingless in the number and distribution of the wax-pores on the body. This might be taken as an indication in some species at least that whether the aphids become winged or wingless is not determined by the external factors after being laid. In some Hormaphidina, as already stated, the antennae and legs of the nymphs of the aleyrodiform female become more rudimentary as the growth proceeds, while those of the nymphs of the winged form become better developed in the later instars.

In the third instar of the winged form, the mesothorax is developed, the wing-pads begin to appear, and the third antennal joint is often longer when compared with that of the corresponding stage of the wingless form. The third antennal joint of the winged form, in some species, as *Oregma bambusifoliae* Takah. and others, is longer when compared with that of the wingless form even in the second instar, and in the grown nymphs of some Hormaphidina and Pemphigina, the antennae of the winged form are longer and with more joints than those of the apterous form. In the fourth instar of the winged form, the wing-pads are well-developed.

The eyes of *Oregma, Cerataphis. Aleurodaphis, Astegopteryx, Cervaphis, Neophyllaphis* and others are composed of three facets in all the instars of the wingless form, as well as in the first three instars of the winged, but in the fourth instar of the winged form, as well as in the winged adults, they are composed of numerous facets.

In the genera *Oregma, Aleurodaphis, Astegopteryx, Cervaphis, Neophyllaphis, Greenidea* and others, the head and pronotum which are usually defined in the

fourth instar of the winged form, are fused together in the other instars of this form, while they are always fused together in the nymphs of the wingless form.

In *Oregma panicola* Takah., as already mentioned, the grown nymphs of the winged form are provided with numerous very small wax-pores scattered over the dorsum of the head and thorax, while those of the apterous form like the wingless adults are provided with some larger circular pores distributed as in *O. montana* v. d. Goot. The nymphs of the brachypterous form usually do not differ from those of the normally winged ones.

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Certain Formosan Aphididae, with descriptions of the nymphs of some of the species.

Macrosiphum smilacicola n. sp.

(Pl. x, A, figs. 4-5)

Wingless viviparous female

Pale yellow. Cornicles black, with the tips paler. Cauda yellowish. Body somewhat elongate oval. Head provided with about 8 moderate or rather long setae on the dorsal surface. Eyes rather small. Frontal tubercles large, slightly convex on the inner side which is furnished with 2 or 3 setae. Antennae very long and slender, provided with some moderately long setae that are not capitate; the 1st joint much larger than the 2nd; the 3rd not imbricated, provided with from 1-3 small circular sensoria arranged in a single row near the base; the 4th somewhat imbricated on the basal half, lacking sensoria; the 5th and 6th imbricated; the relative length of joints about as follows: III-245, IV-194, V-158, VI-270 (50+220). Rostrum reaching beyond the middle coxae.

Abdomen furnished with some short or moderately long setae. Cornicles large, cylindrical, stout, gradually expanded toward the base, dilated at the base, distinctly reticulated on the distal one-third, not imbricated on the basal half, about 2.7 times as long as the cauda, almost as long as the distal part of the last antennal joint. Cauda very stout, broadest at the base, tapering, about twice as long as wide, almost as stout as or more slender than the basal part of the cornicle, furnished with about 8 pairs of long lateral bristles. Legs very long and slender, provided with many moderate or rather long setae;femora furnished with numerous very minute circular sensoria scattered almost over the whole length and one or two larger sensoria near the base; tibiae stouter than the 3rd antennal joint, provided with many very small transversely narrowed sensoria scattered over the whole length except on the distal half of the hind tibia; tarsi imbricated, hind tarsi slightly shorter than the basal part of the last antennal joint.

Length of body-about 3.0 mm. Antenna-about 4.4 mm. Cornicle-about 1.0 mm.

Winged viviparous female.

Pale yellow, with a large black patch at the middle of the dorsum in front of the cornicles and a pair of smaller black patches behind the cornicles. Head and

thorax yellowish brown. Cornicles black, with the tips paler. Cauda yellowish. Wings hyaline. Head on the dorsal surface furnished with about 10 rather short to moderately long setae. Frontal tubercles large, on the inner side somewhat convex and bearing about 2 rather long setae.

Antennae very long and slender, furnished with some moderately long setae that are not capitate; the 3rd joint not imbricated, provided with about 6-8 rather small circular sensoria arranged in a single row on the basal half; the 4th somewhat imbricated, lacking sensoria; the relative length of joints about as follws: III-235, IV-174, V-142, VI-270 (45+225). Rostrum reaching the middle coxae. The 1st oblique (cubitus) of the front wing slightly curved, the 2nd (media 2) straight, the 3rd (media 1) twice forked, with the upper branch extending to the tip of the wing, stigmatic vein (radial sector) moderately curved; hind wings with 2 almost parallel obliques (media and cubitus), hooklets 5. Abdomen furnished wih some moderately long setae.

Cornicles cylindrical, large, stout, gradually expanded toward the base, well reticulated on the distal half, somewhat imbricated on the basal half, about thrice as long as the cauda, slightly longer than the 5th antennal joint. Cauda stout, broadest at the base, tapering, about 1.5 times as long as wide, wider than the basal portion of the cornicle, with about 7 pairs of long lateral bristles on the apical half. Legs very long and slender; femora, especially the hind two pairs, provided with numerous minute circular sensoria scattered over the whole length and about 2 or 3 larger sensoria near the base; tibiae stouter than the 3rd antennal joint, provided with many moderate to rather long setae, the front and middle pairs furnished with many small transversely narrowed sensoria scattered over the whole length, the hind pair with similar ones on the basal half; tarsi imbricated, hind tarsi slightly shorter than the basal part of the last antennal joint.

Length of body-about 3.5 mm. Antenna-about 5.0 mm.

Fore wing-about 5.0 mm. Cornicle-about 1.0 mm.

Host.—*Smilax stenopetala*, attacking the young leaf.

Distribution.– Formosa.

Some specimens were collected by the author on December 2, 1923. This species is peculiar in possessing numerous small sensoria on the legs.

Macrosiphum species.

Wingless viviparous female.

Green. Head brownish green. Eyes dark brown. Antennae and cornicles black. Abdomen dusky on the dorsum. Legs pale brown, apical halves of femora, apices of tibiae, and tarsi black.

Body oval. Head provided with about 10 moderate to rather long setae, some of which are slightly knobbed. Frontal tubercles moderately developed, scarcely convex on the inner side.

Antennae very long and slender, provided with some moderate to rather long setae which are slightly capitate; the 3rd joint not imbricated, provided with about 2 rather small circular sensoria near the base; the 4th somewhat imbricated, lacking sensoria; the relative length of joints about as follows: III-155, IV-110, V-85, VI-202 (32+170) Rostrum reaching a little beyond the middle coxae. Body without tubercles. Abdomen provided with some rather short setae arranged in a transverse row on the dorsum of the segment.

Cornicles long, cylindrical, moderately expanded toward the base, somewhat dilated on the apical portion, very slightly curved, imbricated, reticulated on about the apical one-third, almost twice as long as the cauda, a little shorter than the 3rd antennal joint.

Cauda stout, stouter than the cornicle, about twice as long as wide, provided with 10 long bristles. Legs very long and slender; tibiae stouter than the antenna, more slender than the cornicle, provided with many rather long setae which are not knobbed; tarsi imbricated, hind tarsi almost as long as the base of the last antennal joint.

Length of body about 2. 3 mm. Antenna-about 2. 8 mm.

Cornicle-about 0.65 mm.

Host-*Lactuca debilis*, attacking the stem.

Distribution-Formosa: Taihoku.

Two specimens were collected by the author on February 25, 1923.

Macrosiphum alopecuri Takah.

(Pl. II, A, figs. 1-5 & Pl. V, A, figs. 4-5)

Aphididae of Formosa-1, p. 9 (1921).

Wingless viviparous female.

Green, darker at the middle of the dorsum of the abdominal segment. Eyes dark brown. The 3rd and 4th antennal joints brownish, with the apices black, the

5th mostly black, the 6th black. Cornicles pale green or pale brown, with the apices dusky. Cauda pale green. Legs pale green, apices of tibiae brownish, tarsi black.

Body oval. Head provided with a few short slightly knobbed hairs. Frontal tubercles not very large. Antennae shorter than the body, provided with some short setae which are slightly knobbed; the 1st joint almost 1.5 times as long as the 2nd joint; the 3rd joint not imbricated, provided with 2-4 circular sensoria of medium or small size in a row near the base; the 4th slightly imbricated, lacking sensoria; the relative length of joints as follows: III-127, IV-91, V-69, VI-118 (23+95). Rostrum reaching the middle coxae. Prothorax with a small blunt tubercle on the side. Abdomen provided with some short setae. Cornicles cylindrical, rather stout, somewhat expanded toward the base, not curved, imbricated, reticulated on the apical one-sixth, about 1.5 times as long as the cauda, almost as long as the 3rd antennal joint, not reaching the tip of the cauda.

Cauda ensiform, almost as long as the 4th antennal joint, provided with 7 bristles. Legs long, rather stout, provided with many rather long setae; hind tarsi longer than the base of the last antennal joint.

Length of body-about 2.7 mm. Antenna-about 2.2 mm.

Cornicle-about 0.55 mm.

Winged viviparous female.

Green, darker at the middle of the dorsum of the abdominal segment. Eyes dark brown. Antennae mostly black, with the base of the 3rd joint slightly paler. Mesothorax dusky, somewhat brownish. Abdomen without markings. Cornicles pale brown, with the tips black. Cauda pale green. Wings hyaline; stigma pale green; veins brown or gray. Legs: femora dusky, with the bases pale greenish; tibiae pale brown, with black apices; tarsi black.

Head provided with a few moderately long to rather short bristles. Frontal tubercles not very large, somewhat convex on the inner side. Antennae long and slender, provided with some moderately long setae; the 1st joint somewhat angulated on the inner side; the 3rd not imbricated, provided with about 10 circular sensoria of medium size in a single row over almost the whole length; the 4th somewhat imbricated, lacking sensoria; the relative length of joints as follows: III-125, IV-88, V-79, VI-147(27+120). Rostrum reaching the middle coxae? Prothorax with a very small blunt tubercle on each side. Abdomen provided with a few bristles. Cornicles cylindrical, not curved, moderately stout, gradually expanded toward the base, imbricated, reticulated on about the distal one-fourth, shorter than the 3rd antennal joint, but longer than the 4th antennal joint, about 1.8 times as long as the cauda. Cauda ensiform, with 7 bristles.

Wing-veins normal; hind wings with 2 parallel obliques; hooklets 3. Legs long, provided with many moderate to rather long setae; hind tarsi longer than the base of the last antennal joint.

Length of body-about 2.1 mm. Antenna-about 2.2 mm.

Fore wing-about 4.0 mm. Cornicle-about 0.5 mm.

Host.-*Alopecurus aequalis.* attacking the stem and the base of the leaf.

Distribution.-Formosa: Taihoku.

Some wingless viviparous females and a winged one were collected on January 14,1923, by the author.

This species differs from *Macrosiphum granarium* Kirby in the following characters:

1. Cornicles not black, being pale green or pale brown, with the apices black.
2. Wingless viviparous females without markings on the dorsum of the abdomen.
3. Spur of the last antennel joint shorter than the 3rd antennal joint.

Macrosiphum sp.

(Plate I, A)

Wingless viviparous female.

Green. Eyes black. The 3rd, 4th and 5th antennal joints brown, with black apices, the 6th almost black. Cornicles mostly black, with the basal one-third pale green. Cauda pale green. Femora pale greenish; tibiae pale brownish; apices of tibiae, and the tarsi black.

Body long, somewhat narrowed. Head provided with some moderate to rather long bristles which are slightly knobbed. Frontal tubercles very large, nearly as long as the 2nd antennal joint, slightly convex on the inner side. Antennae very long and slender, provided with some moderately long setae, some of which are slightly knobbed; the 1st joint very large, almost twice as long as the 2nd antennal joint; the 3rd not imbricated, on the basal one-third, provided with about 8-13 rather small circular sensoria that are not in a single row; the 4th scarcely imbricated, lacking sensoria; the 5th somewhat imbricated; the relative length of joints as follows: III-220, IV-195, V-170, VI-303 (53+250). Rostrum reaching beyond the middle coxae.

Abdomen provided with some moderately long hairs which are slightly capitate.

Cornicles long, very slender, cylindrical, moderately expanded at the base, scarcely imbricated, reticulated on the distal portion, almost as long as the 4th antennal joint, a little more than twice as long as the cauda. Cauda long, stouter than the cornicle, provided with about 4 pairs of lateral bristles. Legs very long and slender, provided with many moderately long setae; hind tarsi imbricated, short, almost as long as the 2nd antennal joint.

Length of body-about 3.0 mm. Antenna-about 5.0 mm.
Cornicle-about 1.1 mm.

Host.-*Clematis sp,* attacking the lower surface of the leaf.

Distribution.-Formosa: Taihoku.

Some wingless viviparous females were collected in January, 1923, by the author.

Macrosiphum sp.

(Pl. V, A, figs. 2-3)

Wingless viviparous female.

Dark apple green. Head brownish. Eyes dark brown. Antennae and cornicles black. Cauda pale greenish. Legs pale brown, distal halves of femora, apices of tibiae, and tarsi black.

Body oval, provided with a few very short setae. Frontal tubercles not conspicuously enlarged, scarcely convex on the inner side. Antennae long and slender, provided with some short hairs, some of which are slightly capitate; the 3rd joint not imbricated, with one or two rather small circular sensoria near the base; the 5th somewhat imbricated; the relative length of joints as follows: III-94, IV-79, V-70, VI-155 (25+130). Rostrum reaching beyond the middle coxae. Cornicles cylindrical, moderately stout, moderately expanded toward the base, very slightly or scarcely imbricated, reticulated on about the distal one-fourth, about 1.6 times as long as the cauda, almost as long as, or a little shorter than, the 3rd antennal joint. Cauda almost ensiform, provided with 3 pairs of lateral bristles. Legs slender, with many moderately long setae.

Length of body-about 1.5 mm. Antenna about 2.0 mm.

Host.-A plant of the Gramineae, attacking the stem.

Distribution.-Formosa: Shinten.

A few wingless viviparous females were collected on January 7, 1923, by the writer.

Macrosiphum species.

(Pl. II, B, fig. 5 & Pl. IV, A, fig. 1)

Wingless viviparous female.

Green. Antennae dusky? Cornicles black, with the bases pale greenish. Cauda green? Legs mostly greenish?

Body oval, furnished with many rather long stout bristles, which are not capitate. Head with some very long bristles which are very slightly knobbed. Frontal tubercles very large, straight on the inner side. Antennae very long and slender, with some long very slightly knobbed hairs; the 1st joint very large, much longer than the 2nd, somewhat convex on the inner side; the 3rd somewhat curved, provided with from 3-5 small circular sensoria near the base; the 4th lacking sensoria; the relative length of joints as follows: III-210, IV-188, V-154, VI-290 (70+220). Rostrum reaching beyond the middle coxae? Cornicles long and slender, cylindrical, somewhat expanded toward the base, imbricated, reticulated on the distal half, shorter than the 5th antennal joint, nearly twice as long as the base of the last antennal joint, about 1.3 times as long as the cauda. Cauda very large, stout, longer than the base of the last antennal joint, provided with some long bristles. Legs very long and slender, provided with many long stout hairs which are not capitate; hind tarsi much shorter than the base of the last antennal joint.

Length of body-about 2.3 mm? Antenna-about 4.4 mm.
Cornicle-about 0.65 mm. Cauda-about 0.5 mm.

Host.-*Artemisia vulgaris, var. indica.*

Distribution.-Formosa: Taihoku.

A few wingless forms were collected on January 22, 1923, by Mr. E. Kurosawa.

Macrosiphum gobonis Mats.

Aphididae of Formosa-1, p. 5 (1921) and Aphididae of Formosa-2, p. 69 (1923).

Nymph of viviparous female.

Key to instars.

(1) Antennae 5-jointed.....(2)
—— Antennae 6-jointed.....(3)
(2) The 3rd antennal joint lacking hairs.....The 1st instar.
—— The 3rd antennal joint with some bristles.....The 2nd instar.
(3) Cauda, when seen from above, as long as wide.....The 3rd instar.
—— Cauda longer than wide.....The 4th instar.

(The 1st instar) Blackish brown. Head blackish. Eyes, antennae, cornicles, cauda, and legs almost black. Body oblong, provided with many very long normal bristles arising from very small tubercles. Head rather large, provided on the dorsal surface with 8 very long bristles, which are almost as long as the 1st antennal joint and are not knobbed. Frontal tubercles almost absent. Eyes rather large, somewhat protruding, with small ocular tubercles. Antennae 5-jointed; the 3rd joint almost as stout as, or more slender than, the front tibia, slightly imbricated on the distal part, lacking sensoria and hairs; the 4th somewhat imbricated, somewhat dilated on the distal part, with the apical sensorium of medium or rather small size, furnished on the distal part with 3 long bristles which are shorter than those on the body, the 5th provided with 2 bristles on the base; the relative length of joints as follows: III-42, IV-28, V-102 (17+85). Rostrum reaching beyond the hind coxae. Body lacking lateral tubercles. Cornicles rather stout, stouter than the hind tibia, vey slightly expanded toward the base, somewhat constricted just at the apex, not curved, very slightly imbricated, not reticulated, almost 2.5 times as long as wide, a little longer than the 4th antennal joint, much longer than the hind tarsi. Cauda very short, much shorter than the cornicle, wider than long, almost triangular when seen from above, with a pair of long lateral bristles. Legs large and stout; the front and middle pairs of tibiae provided with some long stout hairs; the hind tibiae almost as long as the 5th antennal joint, furnished with many very long bristles; hind tarsi longer than the base of the 5th antennal joint.

Length of body-about 1.0 mm. Antenna-about 0.9 mm.

(The 2nd instar) Differs from the first instar as follows:

Head provided with more than 10 bristles on the dorsal surface. Frontal tubercles very short. Antennae 5-jointed as in the 1st instar, but longer; the 3rd joint somewhat imbricated on the distal part as in the 1st instar, provided with some moderately long stout hairs which are scarcely knobbed; the 4th with about 5 similar bristles; the relative length of joints as follows: III-67, IV-37, V-127 (17+110). Cornicles longer, much longer than the 4th antennal joint, somewhat expanded toward the base, very slightly curved, not constricted, almost 3 times as long as wide, about 2.8 times as long as the cauda. Cauda longer, somewhat wider than long; provided with 3 pairs of long lateral bristles, of which the basal pair is much longer.

Length of body-about 1.4 mm. Antenna-about 1.15 mm.

Cornicle about 0.3 mm.

(The 3rd instar) Differs from the second instar as follows:

Frontal tubercles moderately developed, very slightly convex on the inner side. Antennae longer, 6-jointed; the 3rd joint not imbricated; the relative length of joints as follows: III-64, IV-57, V-55, VI-153 (20+133). Wing-pads beginning to appear. Cornicles longer, a little more than twice as long as the cauda. Cauda almost as long as wide, provided with about 5 pairs of bristles, of which one pair is much longer.

Length of body-about 2.0 mm. Antenna-about 1.8 mm.

Cornicle-about 0.5 mm.

(The 4th instar) Differs from the third instar as follows:

(Wingless form) Frontal tubercles larger. Antennae longer; the relative length of joints as follows: III-135, IV-95, V-80, VI-197 (30+167). Cornicles very long, almost twice as long as the 5th antennal joint, almost 5 times as long as wide. Cauda more slender, longer than wide, provided with many very long lateral bristles.

Length of body-about 2.3 mm. Antenna-about 2.35 mm.

Cornicle-about 0.65 mm.

The fully-grown nymph differs from the wingless adult in the following characters:

The 3rd antennal joint lacks sensoria. Cornicles not reticulated and not prominently imbricated. Cauda shorter.

(Winged form) Frontal tubercles larger. Antennae longer; the relative length of joints as follows: III-137, IV-100, V-80, VI-210 (30+180). Cornicles very long, almost twice as long as the 5th antennal joint, about 5 times as long as wide, about 2.5 times as long as the cauda.

Cauda about 1.3 times as long as wide, provided with many very long bristles. Wing-pads well developed.

Length of body-about 2.4 mm. Antenna-about 2.8 mm.

Cornicle-about 0.8 mm.

The body is black and the bases of femora and the basal halves of tibiae are somewhat brownish in the grown nymphs (the third and fourth instars); in the fully-grown nymph of the winged form the mesothorax is blackish green, with the wing-pads black.

These descriptions were made from the specimens collected on *Cirsium japonicum* in January and February, 1923, at Taihoku. A few wingless viviparous

females were observed on *Chrysanthemum coronarium* on January 29,1923, at Taihoku. Some viviparous females were collected on *Blumea balsamifera* on November 22, 1923, at Kankau, Koshun, Formosa. The viviparous females, both winged and wingless, were observed in abundance on *Arctium lappa* on November 29,1923, at Heito, Formosa.

Macrosiphum neoartemisiae Takah.

Aphididae of Formosa-1, p. 13 (1921); Aphididae of Formosa-2, p. 75 (1923).

Nymph of viviparous female.

(The first instar) Yellowish green. Eyes dark red. Antennae pale greenish, dusky on the apex of the 4th joint, and the 5th. Cornicles dusky, with pale greenish bases. Cauda pale greenish. Legs pale green, dusky on the tarsi, as well as on the apices of tibiae.

Body oblong, broadest at midlength of the abdomen. Head large, provided on the dorsum with about 10 rather long stout hairs, which are not knobbed. Frontal tubercles almost absent. Eyes somewhat protruding, almost without ocular tubercles.

Antennae almost as stout as the front tibia, 5-jointed; the 3rd joint not imbricated, without hairs; the 4th not imbricated, almost as long as the basal 2 joints taken together, provided with about 4 rather long stout bristles, the sensorium circular and moderate in size; the 5th imbricated, with 1 or 2 bristles on the basal part; the relative length of joints as follows: III-30, IV-22, V-73 (15+58). Rostrum reaching a little beyond the hind coxae. Prothorax without lateral tubercles. Thorax and abdomen furnished with some rather long stout bristles.

Cornicles almost as stout as the hind tibia, somewhat dilated on the distal half, scarcely or very slightly expanded toward the base, curved, not imbricated, slightly shorter than the spur of the last antennal joint.

Cauda very short, much wider than long, much shorter than the hind tarsi, with a pair of long bristles.

Legs large, provided with many long stout hairs; hind tibiae with very long bristles; tarsi very slightly imbricated, with some short bristles; hind tarsi almost as long as the 4th antennal joint.

Length of body-about 0.75 mm. Antenna about 0.6 mm.

(The second instar) Differs from the first in the following characters:

Body provided with about 3 very short blunt lateral tubercles. Frontal tubercles very short. Eyes protruding, with the ocular tubercles slightly protuberant.

Antennae longer; the 3rd joint provided with some moderate or rather long stout bristles; the 4th slightly imbricated on the distal part, provided with some bristles; the relative length of joints about as follows: III-52, IV-35, V-95 (20+75). Cornicles longer, less curved, almost as long as the 5th antennal joint. Cauda longer, provided with 5 bristles.

Length of body-about 1.1 mm. Antenna-about 0.85 mm.

(The third instar). Differs from the second in the following characters:

Antennae longer, 6-jointed, with some knobbed hairs; the 3rd joint not imbricated, sometimes shorter than the 4th; the 4th very slightly imbricated on the distal part; the relative length of joints about as follows: III-33, IV-32, V-35, VI-94 (20+74). Wing-pads beginning to appear. Cornicles longer, less curved, slightly swollen on the distal portion, somewhat expanded at the base, very slightly imbricated, almost as long as the 6th antennal joint, about 4 times as long as the cauda. Cauda longer, almost as long as wide, provided with 3 pairs of lateral and one apical bristles. Tibiae dusky; hind tarsi slightly longer than the cauda.

Length of body-about 1.3 mm. Antenna-about 1.25 mm.

Cornicle-about 0.55 mm.

(The fourth instar) Differs from the third in the following characters:

(Wingless form) Antennae longer; the relative length of joints about as follows: III-65, IV-60, V-55, VI-134 (27+107). Cornicles very long, much longer than the 6th antennal joint. Cauda longer, somewhat longer than wide, provided with about 5 pairs of lateral and an apical bristle.

Length of body-about 1.7 mm. Antenna-about 1.6 mm.

Cornicle-about 0.65 mm.

(Winged form). The relative length of antennal joints about as follows: III-70, IV-60, V-53, VI-137 (27+110). Wing-pads well developed, dusky. Mesothorax greenish.

Length of body-about 2.1 mm. Antenna-about 1.55 mm.

Cornicle-about 0.68 mm.

Described from specimens collected in March, 1923, at Taihoku.

Macrosiphum perillae n. sp.

(Pl. VIII, B, figs. 1-5)

Wingless viviparous female.

Body pale yellowish brown, somewhat shining. Thorax dark brown on the dorsum, abdomen dark brownish on either side of the dorsum. Eyes dark brown.

Antennae and cornicles black. Cauda pale yellowish brown. Legs pale brown, distal halves of femora, apices of tibiae, and tarsi black.

Body oval. Head on the dorsal surface provided with 8 very long somewhat knobbed stout hairs arising from very small tubercles, these hairs almost as long as the 2nd antennal joint. Frontal tubercles on the inner side somewhat convex and provided with a similar hair. Eyes normal. Antennae long and slender; the 1st joint much larger than the 2nd; the 3rd somewhat imbricated at the base, provided with 3 or 4 large circular sensoria, which are not protruding, arranged in a longitudinal row near the base, with about 13 long, somewhat knobbed, stout hairs which are shorter than those on the head; the portion on which the sensoria are situated dilated; the 4th somewhat imbricated, without sensoria, provided with a few similar hairs; the relative length of joints about as follows: III-95, IV-68, V-65, VI-184 (28+153). Rostrum reaching the hind coxae. Pronotum with 6 very long somewhat knobbed stout hairs arising from very small tubercles; meso-and metathorax and abdominal segments each provided with some similar hairs arranged in a transverse row on the dorsal surface; these hairs and those on the head almost equal in length. Cornicles cylindrical, very long and slender, slightly dilated toward the base, slightly expanded at the base, sometimes very slightly curved, imbricated, scarcely or not reticulated, a little shorter than the 3rd antennal joint, nearly twice as long as the cauda. Cauda long and slender, provided with 3 pairs of very long lateral and an apical bristle. Legs very long and slender, provided with many very long setae; trochanter and basal part of the femur provided with a few small circular sensoria; tarsi somewhat imbricated, hind tarsi shorter than the base of the last antennal joint.

Length of body-about 1.6 mm. Antenna-about 2.3 mm.
Cornicle-about 0.5 mm.

Winged viviparous female.

Eyes dark brown. Antennae and cornicles black. Thorax shining black. Abdomen yellowish brown, with many dark brown patches on the dorsum. Wings hyaline; veins and stigma gray. Cauda yellowish brown. Legs pale brown, with the apical halves of femora, apices of tibiae, and tarsi black.

Head provided with rather long stout hairs on the dorsal surface. Frontal tubercles distinct, somewhat convex on the inner side which is provided with a similar hair. Antennae very long and slender; the 1st joint larger than the 2nd; the 3rd stouter than the 4th, imbricated on the basal part, provided with from 13-16 large circular sensoria arranged almost in a single row over the whole length except at the base and the tip, with a few stout hairs which are much shorter than those on the head; the 4th imbricated, without sensoria, but with some short setae; the relative length of joints about as follows: III-107, IV-90, V-77, VI-170 (30+140).

Rostrum reaching the hind coxae. Venation normal; the 1st and 2nd obliques on the front wing stout; hind wings with 2 almost parallel obliques; hooklets 2. Abdomen provided with some long stout hairs, which are almost as long as those on the head and scarcely knobbed, arranged in a transverse row on the dorsum of the segment. Cornicles cylindrical, very long and slender, very slightly tapering, not dilated at the base, scarcely curved, imbricated, roughly reticulated at the tip, very slighty shorter than the 3rd antennal joint. Cauda long and slender, provided with 3 pairs of lateral and an apical very long bristle.

Legs very long and slender; tibiae provided with many rather long setae; tarsi imbricated; hind tarsi shorter than the base of the last antennal joint.

Length of body-about 1.7 mm. Antenna-about 2.3 mm.
Fore wing-about 2.7 mm. Cornicle-about 0.5 mm.

The young and grown nymphs, as well as the winged and wingless viviparous females, are provided with a few small circular sensoria on the trochanter and the basal part of the femur.

Host.-*Perilla ocymoides* L., attacking the lower side of the leaf.

Distribution.-Formosa: Shinten near Taihoku.

Many winged and wingless viviparous females were collected on May 13, 1923, by the author.

Macrosiphum formosanum Takah.

Aphididae of Formosa, part 1, p. 6 (1921) and part 2, p. 74 (1923).

Brachypterous viviparous female.

Differs from the wingless viviparous female in the following points:

1. Wings of a nymphal character present.
2. Head with 3 very small ocelli.
3. Thorax somewhat developed, but not so well as that of the winged form.

The relative length of the antennal joints is about as follows: III-184, IV-40, V-40, VI-130 (20+110).

A brachypterous female was produced in May, and another one in August, 1923, by the wingless form in my laboratory at Taihoku.

Myzus tropicalis Takah.

(Pl. VII, A, Fig. 2-5)

Aphididae of Formosa-2, pp. 24 and 81 (1923).

Nymph of viviparous female.

Key to instars.

(1) Antennae 4-jointed.....The 1st instar.
—— Antennae 5 or 6-jointed.....(2)
(2) Antennae 5-jointed.....(3)
—— Antennae 6-jointed.....(4)
(3) The 3rd antennal joint about 2.3 times as long as the basal part of the 5th.....The 2nd instar.
—— The 3rd antennal joint more than 3 times as long as the basal part of the 5th.....The 3rd instar.
(4) The 3rd antennal joint somewhat longer than the 4th, about twice as long as the basal part of the 6th.....The 3rd instar.
—— The 3rd antennal joint much longer than the 4th, more than twice as long as the basal part of the 6th.....The 4th instar.

The antennae of the 3rd instar are usually only 5-jointed as in the 2nd instar, but are rarely 6-jointed. In the 4th instar the 3rd and 4th antennal joints are sometimes poorly defined.

(The first instar) Pale yellowish green. Eyes dark reddish brown. Antennae pale greenish, dusky on the last joint. Cornicles pale greenish, dusky on the apical part. Cauda pale greenish. Legs pale greenish, dusky on the tarsi. Body a little more than twice as long as wide.

Head provided with a few rather long stout bristles. Frontal tubercles very short, but distinctly gibbous on the inner side. Eyes somewhat protruding, without ocular tubercles. Antennae almost as long as the body, 4-jointed, imbricated, provided with a few stout bristles of moderate length; the 1st joint somewhat convex on the inner side; the 3rd provided with about 2 bristles near the apex, the sensorium rather small; the relative length of joints about as follows: III-37, IV-73 (13+60). Rostrum reaching a little beyond the middle coxae. Abdomen with a few short hairs.

Cornicles short, rather stout, broadest at the base, very slighthy tapering, not expanded at the base as in the adult, scarcely or not curved, imbricated, not reticulated as in the adult, about twice as long as wide, longer than the base of the last antennal joint. Cauda very short, broadly rounded, with 2 bristles. Legs stout; front and middle tibiae with some short setae, hind tibiae with some very long bristles; hind tarsi very slightly longer than the base of the last antennal joint.

Length of body-about 0.65 mm.

The wingless viviparous females were observed in abundance on *Prunus persica* in April, 1923, at Taihoku, when a few winged forms were also observed.

The cauda of the full grown nymph is triangular when seen from above, wider than long, and is provided with about 3 pairs of long stout bristles.

A winged viviparous female, collected on April 2, 1923, at Taihoku, was provided with about 18 sensoria on the 3rd antennal joint.

Some wingless viviparous females were collected by Mr. M. Kurisaki at Tadono, Wakayama-prefecture, Japan, on April 29, 1920, and by the author at Fukuoka, Japan, on june 2, 1923. This aphis was hitherto unknown from Japan.

Myzus varians Davidson?

(Pl. I, B, figs. 6-7 & Pl. VI, A, fig. 3)

Journal Econ. Entom. V, p. 409 (1912).

Wingless viviparous female.

Yellow. Eyes black. Antennae pale yellowish, apices of joints 3-5 and most of the 6th blackish. Cornicles pale yellow, with the apices black. Cauda yellow. Legs pale yellow, apices of tibiae, and tarsi black. Body oval. Head provided with a few moderate to rather long bristles which are somewhat capitate. Eyes protruding, not large. Frontal tubercles large, almost as long as the 2nd antennal joint, convex on the inner side. Antennae imbricated, almost without hairs; the 1st joint slightly convex on the inner side; the 3rd joint lacking sensoria; the relative length of joints as follows: III-95, IV-63, V-60, VI-144 (25+119). Rostrum reaching beyond the middle coxae. Abdomen provided with a few rather short bristles. Cornicles long, cylindrical, moderately stout, somewhat expanded toward the base, very slightly curved on the distal portion, imbricated, not reticulated, slightly longer than the 3rd antennal joint, almost thrice as long as the cauda. Cauda broadest at the base, tapering, stouter than the cornicle, provided with 3 pairs of lateral bristles. Legs long and slender, provided with some moderately long bristles; hind tarsi nearly as long as the base of the 6th antennal joint.

Length of body-about 1.6 mm. Antenna-about 2.0 mm.

Cornicle-about 0.55 mm.

Winged viviparous female.

Head, eyes and antennae black. Thorax almost black. Cornicles blackish.

Cauda black. Abdomen dark green, blackish on the dorsum. Wings hyaline, veins brownish. Legs brown, distal halves of femora, apices of tibiae, and tarsi black.

Frontal tubercles well developed, moderately convex on the inner side which is provided with some rather long bristles. Antennae imbricated, with a few very short hairs; the 1st joint very large, moderately convex on the inner side; the 3rd joint with the basal five-sixths provided with about 15 circular sensoria of medium size, not arranged in a single row; the 4th without sensoria; the relative length of joints about as follows: III-125, IV-87, V-81, VI-218 (32+186). Rostrum nearly reaching the middle coxae. Abdomen with some moderately long bristles. Cornicles cylindrical, almost as long as the 4th antennal joint, somewhat imbricated, somewhat expanded toward the base, somewhat curved. Wing-veins normal; hind wings with 2 slightly divergent obliques; hooklets 3. Legs long and slender, furnished with moderately long hairs; hind tarsi shorter than the base of the last antennal joint.

Length of body-about 1.7 mm. Antenna-about 2.5 mm.

Cornicle-about 0.4 mm. Fore wing-about 3.2 mm.

Host.-*Clematis species*, attacking the lower surface of the leaf.

Distribution.-Formosa: Taihoku.

North America.

Hitherto unrecorded from Formosa.

A few wingless and a winged viviparous female were collected on January 5, 1923, by the author.

Myzus plantagineus Pass?

Passerini, Gli Afidi, p. 35 (1860).

Wingless viviparous female.

Pale brown, greenish on the anterior half and yellowish on the posterior part. Eyes black. Antennae pale brown, distal half of the 5th joint, and the 6th black. Cornicles brownish on the basal half, with the distal part blackish. Cauda pale yellowish brown. Legs pale brown, apices of tibiae, and tarsi black. Body oval. Head almost without hairs. Frontal tubercles almost as long as the 2nd antennal joint, moderately convex on the inner side. Antennae long and very slender, imbricated, without hairs; the 3rd joint without sensoria; the 5th with a sensorium of medium or rather small size at the tip; the relative length of joints as follows: III-88, IV-70, V-57, VI-123 (23+100). Rostrum reaching the hind coxae. Prothorax with a very small blunt lateral tubercle. Abdomen with a few very small hairs. Cornicles very long and slender, cylindrical, slightly curved,

somewhat expanded toward the base, imbricated with the exception of the part near the apex, not reticulated, almost as long as the 3rd antennal joint, much longer than the cauda.

Cauda very stout, stouter than the cornicle, tapering on the distal part.

Legs very long and slender; tibiae more slender than the cornicle, provided with many moderately long setae, mostly on the distal half; hind tarsi almost as long as the base of the last antennal joint.

Length of body-about 1.5 mm? Antenna-about 1.9 mm.

Cornicle-about 0.5 mm.

Of three specimens of the wingless form that I have collected, two are not provided with sensoria on the 3rd and 4th antennal joints, but one is furnished with 3 or 4 very small almost circular or oval sensoria on the distal portion of the 3rd joint, 9 to 13 similar ones not arranged in a single row on the 4th, and 4 or 5 in a single row on the 5th.

Winged viviparous female.

Head and thorax shining black. Eyes, antennae, cornicles and cauda black. Abdomen brownish green, almost blackish on the dorsum. Legs pale brown, distal halves of femora, apices of tibiae, and tarsi black. Wings hyaline; stigma pale gray; veins almost blackish brown. Head provided with about 8 minute hairs on the dorsal surface. Frontal tubercles not very large, distinctly convex on the inner side. Eyes large, with distinct ocular tubercles. Antennae very long and slender, without hairs; the 1st joint much larger than the 2nd; the 3rd very long, slightly imbricated, provided with about 58 rather large circular or oval sensoria scattered over the whole length; the 4th somewhat imbricated, provided with about 29 similar sensoria scattered over the whole length; the 5th with about 11 sensoria; the relative length of joints as follows: III-150, IV-94, V-68, VI-149 (27+122). Rostrum reaching the middle coxae. Prothorax with a small blunt lateral tubercle near the hind margin. Abdomen provided with a few minute hairs arranged in a transverse row on the dorsum of the segments. Cornicles cylindrical, slender, scarcely curved, somewhat expanded toward the base, stouter than the tibia, imbricated except near the tip, not reticulated, almost as long as the 5th antennal joint, much longer than the cauda.

Cauda stout, more so than the cornicle, somewhat longer than wide, tapering, narrowed on the distal part, with about 6 rather long lateral bristles. Legs very long and slender, tibiae provided with many moderate to rather long setae, mostly

on the distal half; hind tarsi almost as long as the base of the last antennal joint. Wings normal; hind wings with 2 almost parallel obliques; hooklets 3.

Length of body-about 1.8 mm? Antenna-about 2.4 mm.

Fore wing-about 2.8 mm. Cornicle-about 0.3 mm.

Fully-grown nymph of winged viviparous female

Pale brownish. Head provided with 8 very small hairs on the dorsum. The middle of the front distinctly protruding. Eyes large, with distinct ocular tubercles. Frontal tubercles distinct, with the inner side distinctly convex. Antennae rather stout, imbricated, 6-jointed, without hairs; the 1st joint larger than the 2nd, somewhat convex on the inner side; the 3rd somewhat stouter than the front tibia, lacking sensoria; the relative length of joints as follows: III-80, IV-60, V-49, VI-121 (21+100). Rostrum reaching beyond the middle coxae. Prothorax with a small blunt lateral tubercle. Abdomen with about 3 very small blunt lateral tubercles, the segments provided with a few moderately long to rather short setae. Cornicles cylindrical somewhat expanded toward the base, imbricated for almost the entire length; not or but slightly curved, stouter than the tibia, almost as long as or slightly longer than the 4th antennal joint, not reticulated.

Legs long; front and middle tibiae provided with some moderately long setae; the hind with long bristles; tarsi imbricated; hind tarsi slightly longer than the base of the last antennal joint. Cauda very short and stout, wider than long, shorter than the hind tarsi, rounded, with about 5 long bristles.

Length of body-about 1.4 mm. Antenna about 1.6 mm.

Cornicle-about 0.3 mm.

Young nymph (the first instar).

Pale brownish. Body almost without hairs. Frontal tubercles very short, somewhat convex on the inner side. Eyes large, somewhat protruding, with the ocular tubercles indistinct. Antennae stout, slightly imbricated, 5-jointed, without hairs; the 3rd joint almost as stout as the front tibia, without sensoria; the 4th provided with a circular apical sensorium of medium size; the relative length of joints as follows: III-23, IV-18, V-65 (15+50). Rostrum long and stout, reaching the hind coxae. Cornicles short and stout, almost as stout as, or slightly more than, the hind tibia, almost twice as long as wide, slightly expanded at about midlength, somewhat imbricated, almost as long as the 4th antennal joint, the base as wide as the middle. Cauda short, wider than long, rounded, provided with a pair of long bristles. Legs stout, provided with some moderately long setae; hind

tibiae with a few long bristles, tarsi slightly imbricated; hind tarsi almost as long as the base of the last antennal joint.

Length of body-about 0.7 mm. Antenna-about 0.55 mm.

Host.-*Plantago major*, attacking the lower surface of the leaf.

Distribution.-Formosa: Taihoku.

A few viviparous females were collected on February 6, 1923, by the writer.

Capitophorus braggii (Gillette).

(Pl. III, A, fig. 6 & Pl. VI, A, figs. 4-5)

Myzus braggii, Gillette, Can. Ent. xl, p. 17 (1908); Swain, Univ. California, Pub. III, p. 73 (1919).

Capitophorus braggii, van der Goot, Kenntnis Holland. Blattl. p. 119 (1915).

Wingless viviparous female.

Pale yellowish green. Each thoracic and abdaminal segment with a pair of green patches on the dorsum. Eyes dark red. Antennae pale greenish, apex of the 5th joint and the base of the 6th very slightly dusky. Cornicles pale greenish, slightly dusky at the apex. Cauda pale greenish. Legs pale greenish, the tarsi slightly dusky.

Body soft, somewhat narrowed, provided with many distinct stout capitate hairs arising from very small tubercles. Head provided with 3 pairs of long capitate hairs between the frontal tubercles and 4 similar but much shorter hairs between the eyes. Frontal tubercles very large, almost as long as the 2nd antennal joint, slightly convex on the inner side which is provided with 2 long capitate hairs. The capitate hairs on the front almost as long as the 2nd antennal joint. Eyes rather small, protuberant. Antennae very long and slender, imbricated, furnished with a few very short capitate hairs; the 1st joint much larger than the 2nd, well developed on the inner side; the 3rd joint without sensoria; the relative length of joints as follows: III-93, IV-70, V-65, VI-197 (22+175). Rostrum reaching the hind coxae. Abdomen furnished with 6 capitate hairs on the dorsum of each segment, those on the posterior two or three segments and near the sides longer. Cornicles long, very slender, cylindrical, sometimes slightly curved, slightly expanded at the base, imbricated, not reticulated, a little shorter than the spur of the 6th antennal joint, almost thrice as long as the cauda. Cauda broadest at the base, gradually tapering, about twice as long as wide, furnished with about 10 bristles. Legs very long and slender, provided with many hairs, some of which are knobbed; hind tarsi short, almost as long as the base of the last antennal joint.

Length of body-about 1.8 mm. Antenna-about 2.0 mm.
Cornicle-about 0.6 mm.

Host.-*Cirsium japonicum*, attacking the lower surface of the leaf.

Distribution.-Formosa: Taihoku. Japan.
North America; Europe?

Some wingless viviparous females were observed on December 24 and 30, 1922. Hitherto unrecorded from Formosa.

Capitophorus formosartemisiae Takah. (Aphididae of Formosa-1, p. 25, 1921) is closely related to *Capitophorus pilosus* v. d. Goot (Tijdschr. voor Entom. 1912, p. 68), but differs from it in the much shorter antenna, as well as in lacking sensoria on the 3rd antennal joint of the wingless viviparous female.

C. formosartemisiae Takah. and *C. braggii* Gillette were collected by Mr. M. Kurisaki at Tadono in Wakayama-prefecture, Japan, and *C. hippophaes* (Koce) by the author on *Galeopsis sp.* at Hakozaki in Fukuoka-prefecture, Japan, and on *Polygonum sp.* at Kyoto and Tokyo, in June, 1923.

It has never been determined that *Phorodon galeopsidis* Mats. (Trans. Sapporo Nat. Hist. Soc. vii, pt. 1, p. 15, 1918) is synonymous with *Myzus galeopsidis* (Kalt.) or *Capitophorus hippophaes* (Koch).

Capitophorus species.

Wingless viviparous female

Yellow. Body oval, provided with a few capitate hairs. Head furnished with a pair of capitate hairs at the middle of the front, as well as on the dorsum between the frontal tubercles. These hairs very stout, almost as long as the 2nd antennal joint, each arising from a very small tubercle. Frontal tubercles distinct, on the inner side somewhat convex and furnished with 2 similar capitate hairs one of which is shorter. Eyes rather small, with small ocular tubercles. Antennae long and slender, imbricated, lacking distinct hairs; the 1st joint much larger than the 2nd, convex on the inner side; the 3rd sometimes very slightly curved, without sensoria; the relative length of joints about as follows: III-60, IV-50, V-45, VI-118 (18+100). Rostrum reaching beyond the middle coxae. Sides of the pro-and mesothorax each furnished with a capitate hair, which is almost as long as those on the head. Basal abdominal segments without hairs, the 7th segment furnished with a pair of capitate hairs on the dorsum, the 8th with 6 similar dorsal hairs which are a little longer than those on the head. Cornicles very long and slender, cylindical, somewhat expanded at the base, almost as slender as, but shorter than, the hind

tibia, imbricated, almost as long as the distal part of the last antennal joint, about 3 times as long as the cauda, extending beyond the tip of the cauda. Cauda rather large, stout, gradually tapering, about twice as long as wide, with no constrictions, with about 3 pairs of lateral bristles. Legs slender, with many moderately long to rather short non-capitate setae; tarsi imbricated; hind tarsi almost as long as the basal part of the last antennal joint.

Length of body-about 1.3 mm. Antenna-about 1.5 mm.
Cornicle-about 0.5 mm.

Host.-*Cirsium japonicum*, attacking the leaf.

Distribution.-Formosa: Kusukusu in Koshun.

Some wingless forms were collected by the author on November 25, 1923. This aphis closely allied to *C. carduinus* Walk., but is a distinct species.

Neophorodon rubi Takah.

(Pl. VIII, A, figs. 9-11).

Proc. Entom. Soc. Washington, 24, p. 204 (1922) and Aphididae of Formosa-2, p. 17 (1923).

The author collected some wingless viviparous females and a full-grown nymph of the winged form on the leaves of *Rubus sp.* on May 13, 1923, at Shinten, near Taihoku. These specimens differ somewhat from those described in the former papers.

Wingless viviparous female.

Pale yellow. Eyes black. Antennae pale yellowish, apices of the 3rd, 4th, and 5th joints, and the 6th except the base black. Cornicles pale yellow, with black apices. Cauda yellow. Legs pale yellowish brown. Body oval. Head rather small, the dorsal side provided with 8 rather long capitate hairs, which are shorter than the 2nd antennal joint and arise from very small tubercles, and two similar hairs on the front. Frontal tubercles conspicuous, almost as long as the 2nd antennal joint, very slightly convex on the inner side which is provided with 2 similar capitate hairs. Eyes rather small, very conspicuously protuberant, with large ocular tubercles. Antennae long and slender, imbricated, provided with a few or more very short capitate hairs; the 1st joint larger than the 2nd, on the inner side with a distinct projection which is almost as long as the joint, almost attains the apex of the 2nd, and is provided with about 3 short capitate hairs; the 2nd without a tubercle; the 3rd more slender than the front tibia, without sensoria; the 4th sometimes fused with the 3rd; the 5th with an apical sensorium of rather small

size; the relative length of joints about as follows: III-55, IV-40, V-35, VI-92 (22+70). Rostrum reaching beyond the middle coxae. Pronotum provided with 6 rather long capitate hairs arising from very small tubercles on the dorsum and with a similar, but longer hair on either side. Meso-and metathorax each with 4 similar capitate hairs arranged in a transverse row on the middle of the dorsum and 2 others on the either side. The 1st abdominal segment with 4 capitate hairs arranged in a transverse row on the middle of the dorsum and a similar one on either side; the 2nd, 3rd, 4th and 5th each with a pair of similar hairs on the middle of the dorsum and one on the side of each; the 6th, 7th, and 8th each with 6 or more similar hairs arranged in a transverse row on the dorsum. Cornicles long and slender, somewhat dilated on the distal half and at the base, broadest at the base, not curved, scarcely imbricated, not reticulated, almost as long as the last antennal joint. Cauda stout. Legs long and slender, provided with many rather long setae; tibiae more slender than the cornicle; tarsi somewhat imbricated; hind tarsi almost as long as the base of the last antennal joint.

Length of body-about 1.7 mm. Antenna-about 1.3 mm.

The winged form is not provided with capitate hairs, but the nymyh possesses them.

Amphorophora oleraceae v. d. Goot.

Aphididae of Formosa-1, p. 28 (1921); Aphididae of Formosa-2, p. 84 (1923).

Nymph of viviparous female.

(The first instar) Green. Eyes dark brown. Antennae pale green, apices of joints very slightly dusky. Cornicles and cauda pale green. Legs pale green, tarsi dusky.

Body oblong, slightly more than twice as long as wide, lacking hairs. Frontal tubercles absent. Eyes somewhat protuberant; ocular tubercles almost absent. Antennae 4-jointed, somewhat shorter than the body, without hairs; the 3rd joint slightly imbricated on the distal portion, with a sensorium of rather small size at the apex; the 4th imbricated, the base almost as long as the 2nd; the relative length of joints as follows: III-40, IV-61 (12+49). Rostrum reaching slightly beyond the hind coxae. Body without tubercles. Cornicles stout, nearly as stout as the hind tibia, almost twice as long as wide, nearly as long as the hind tarsi, scarcely or very slightly expanded about the middle, not expanded at the base, with the apex somewhat constricted, neither imbricated nor reticulated.

Cauda short, broadly rounded, much shorter than wide, with a pair of rather long bristles.

Tibiae stouter than the 3rd antennal joint; front and middle tibiae provided with some rather short setae; distal portions of hind tibiae with some very long bristles; tarsi very slightly imbricated; hind tarsi longer than the base of the last antennal joint.

Length of body-about 0.75 mm.

(The second instar). Colour almost as in the first instar. Head provided with a few minute hairs. Frontal tubercles quite short or almost absent. Eyes with small ocular tubercles.

Antennae somewhat shorter than the body, almost without hairs, 5-jointed; the 1st joint much larger than the 2nd; the 3rd very slightly imbricated on the distal portion; the 4th almost as long as, or slightly shorter than, the basal 2 joints taken together, with the sensorium small; the relative length of joints as follows: III-46, IV-25, V-86 (16+70). Rostrum reaching beyond the middle coxae. Body without tubercles.

Abdomen almost without hairs. Cornicles more than thrice as long as wide, somewhat narrowed toward the apex and base, not expanded at the base, almost as stout as the hind tibia, longer than the 4th antennal joint, more than twice as long as the cauda, longer than the hind tarsi, not imbricated nor reticulated. Cauda broadest at the base, tapering, wider than long, provided with 2 pairs of long bristles. Front and middle tibiae provided with some moderately long to rather short setae; hind tibiae furnished with some very long bristles; tarsi somewhat imbricated; hind tarsi longer than the cauda, almost as long as the 4th antennal joint.

Length of body-about 1.0 mm. Antenna-about 0.8 mm.

The second instar differs from the first in the following characters:

Antennae 5-jointed. Cornicles longer. Cauda longer.

(The third instar) Colour almost as in the second instar. Wing-pads pale green. Head provided with a few minute hairs. Frontal tubercles very short. Eyes with distinct ocular tubercles. Antennae somewhat shorter than the body, 6-jointed, provided with a few minute hairs which are slightly knobbed; the 1st joint much larger than the 2nd; the 3rd scarcely imbricated; the 4th somewhat imbricated, almost as long as the basal two joints taken together; the 5th with an apical sensorium of rather small size; the relative length of joints as follows: III-45, IV-37, V-40, VI-120 (20+100). Rostrum reaching the middle coxae. Body without tubercles. Wing-pads beginning to appear. Abdomen either without hairs or furni-

shed with a few very short ones. Cornicles rather stout, very slightly dilated about the middle, scarcely or very slightly expanded at the base, almost 4 times as long as wide, stouter than the hind tibia, longer than the 3rd antennal joint, a little more than twice as long as the cauda, neither imbricated nor reticulated. Cauda almost triangular when seen from above, almost as long as to somewhat shorter than the hind tarsi, somewhat wider than long, provided with 3 pairs of lateral bristles. Legs long; tibiae stouter than the antenna; front and middle tibiae provided with some moderately long setae; hind tibiae provided with some very long bristles; tarsi imbricated; hind tarsi longer than the base of the last antennal joint.

Length of body-about 1.5 mm. Antenna-about 1.3 mm.

The third instar differs from the second in the following characters:

Antennae 6-jointed. Wing-pads beginning to appear. Cornicles and cauda longer.

(The fourth instar) Colour almost as in the third instar.

(Wingless form) Body oval. Head provided with a few minute hairs. Frontal tubercles distinct, with the inner side slightly convex. Antennae 6-jointed, provided with a few minute slightly knobbed hairs; the 1st joint larger than the 2nd; the 3rd not imbricated, without sensoria; the 4th imbricated; the 5th with the apical sensorium small, much longer than the basal two joints taken together; the relative length of joints as follows: III-79, IV-60, V-55, VI-145 (25+120). Rostrum reaching the middle coxae.

Body without tubercles. Abdomen provided with a few very short hairs. Cornicles about 5 times as long as wide, rather stout, somewhat expanded about the middle, slightly dilated at the base, much stouter than the hind tibia, almost as long as the 3rd antennal joint, more than twice as long as the cauda. Cauda stout, much stouter than the cornicle, broadest at the base, tapering, almost as long as wide, with the apex rounded, slightly longer than the hind tarsi, with about 3 pairs of long bristles. Legs long; front and middle tibiae provided with many moderately long setae; hind tibiae with many very long bristles; tarsi imbricated; hind tarsi a little longer than the base of the last antennal joint.

Length of body-about 2.1 mm. Antenna-about 1.7 mm.

(Winged form). Almost as in the wingless form.

The relative length of antennal joints as follows: III-80, IV-55, V-50, VI-123 (23+100). Wing-pads well developed.

Length of body-about 2.2 mm. Antenna-about 1.7 mm.

The fourth instar differs from the third in the following characters: Wing-pads well developed in the nymph of the winged form. Antennae, cornicles and cauda longer.

Described from specimens collected on *Lactuca debilis* in February, 1923, at Taihoku, Formosa.

Some viviparous females, both winged and wingless, were collected by Mr. M. Kurisaki at Tadono in Wakayama-prefecture, Japan, on April 28, 1920, and by the author at Kyoto, on June 4, 1923. Hitherto unrecorded from Japan.

Amphorophora sonchifoliae Takah.

Aphididae of Formosa-2, p. 31 (1923).

The cornicles of the wingless viviparous female are about 1.5 times as long as the cauda as in *A. oleraceae* v. d. Goot. In the original description they are incorrectly recorded as being about 1.7 times as long as the cauda.

Amphorophora taiwana Takah.

(Pl. IX, B, figs. 3-4)

Macrosiphum taiwanum, Takahashi, Aphididae of Formosa-2, p. 16 (1923).

The cornicles of the wingless viviparous female are slightly to somewhat more dilated on the distal portion and this species must be removed to the genus *Amphorophora*.

Rhopalosiphum lahorensis (Das)

(Pl. VI, B, figs. 9-13)

Aphididae of Formosa-1, p. 38 (1921); Aphididae of Formosa-2, p. 92 (1923).

Wingless viviparous female

Green. Eyes blackish brown. Antennae pale greenish, blackish on the distal half. Cornicles pale greenish brown, slightly dusky at the apex. Cauda pale greenish. Legs pale greenish, tibiae slightly brownish on the distal part, tarsi black. Body oval, not covered with a powder, furnished with many, distinct, very short, flat, fan-shaped hairs. Head broad. Frontal tubercles almost lacking. Eyes not very large, distinctly protuberant, the ocular tubercles quite small, hardly visible. Antennae slender, imbricated, shorter than the body, provided with a few very small hairs; the 1st joint much larger than the 2nd, the 3rd without sensoria, the 5th with a sensorium of moderate size; the relative length of joints about as follows: III-35, IV-19, V-22, VI-62 (20+42). Rostrum almost reaching the hind coxae. Prothorax with a rather small lateral tubercle.

Abdomen provided with some very short fan-like hairs arranged in a trans-

verse row on the dorsum of the segments, those on the posterior half larger than those on the anterior half.

Cornicles slender, very slightly dilated on the distal portion, not dilated at the base, not curved, not reticulated, somewhat imbricated, longer than the spur of the last antennal joint, often almost as long as the last antennal joint, about twice as long as the cauda. Cauda stout, broadest at the base, gradually tapering, with the apex rounded, without distinct constrictions, about 1.7 times as long as wide, slightly shorter than the 3rd antennal joint, provided with about 5 long bristles. Legs slender; fore tibiae stouter than the 3rd antennal joint; hind tibiae almost as stout as the cornicle, provided with many rather long hairs, some of which are capitate; tarsi imbricated, much shorter than the cauda. Anal plate broadly rounded, with a few long hairs.

Length of body-about 1.2 mm. Antenna-about 0.75 mm.

Host.-*Chrysanthemum sp.*, attacking the leaf and flower.

Distribution.-Formosa: Taihoku. India (Das).

A few wingless viviparous females were collected by the writer on March 26, 1923.

Aphis rufomaculata Wilson (Entom. News, XIX, p. 261, 1908) seems to be very closely allied to this species.

Cavariella neocapreae Takah.

(Pl. VII, A, figs. 6-10 and Pl. VII, B, figs. 1-2).

Aphididae of Formosa-1, p. 37 (1921); Aphididae of Formosa-2, p. 36 and 93 (1923).

Nymph of viviparous female.

Key to instars.

(1) Antennae 4-jointed.....The 1st instar.
—— Antennae 5-jointed.....(2)
(2) The 3rd antennal joint about twice as long as the 4th, almost as long as the spur of the last joint.....The 2nd instar.
—— The 3rd antennal joint more than twice as long as the 4th, longer than the spur.....(3)
(3) The 3rd antennal joint more than twice as long as the 4th.....The 3rd instar.
—— The 3rd antennal joint more than thrice as long as the 4th.....The 4th instar.

(The first instar) Yellowish green. Eyes black. Antennae pale greenish, very slightly dusky on the 4th joint. Cornicles slightly dusky. Cauda pale greenish. Tubercle above the cauda very slightly dusky. Legs pale greenish, slightly dusky on the tarsi.

Body oblong, slightly more than twice as long as wide. Head large, provided with a few rather long stout bristles on the front. Frontal tubercles absent. Eyes somewhat protuberant, without ocular tubercles. Antennae very short, almost as long as the width of the body, 4-jointed, provided with a few short setae; the 3rd joint almost as long as the basal two joints taken together, with the sensorium very small; the 4th somewhat imbricated; the relative length of joints about as follows: III-17, IV-29 (13+16). Rostrum reaching the hind coxae. Abdomen without lateral tubercles, provided with a pair of short bristles at the middle of the dorsum and a similar hair on either side of each segment. Tubercle above the cauda very short, wider than long, provided with a pair of long stout bristles. Cornicles very short and stout, about 1.5 times as long as wide, not expanded at the base, constricted at the apex, somewhat imbricated, almost as long as the spur of the last antennal joint. Cauda wider than long, rounded, provided with a pair of rather long bristles. Legs stout; the front and middle tibiae provided with a few short setae, hind tibiae almost as stout as the cornicle, with some very long bristles; hind tarsi almost as long as the 3rd antennal joint.

Length of body-about 0.75 mm.

(The second instar) Antennae 5-jointed, the relative length of joints about as follows: III-20, IV-10, V-37 (14+23).

(The third instar) Antennae 5-jointed, the relative length of joints about as follows: III-34, IV-13, V-45 (16+29).

(The fourth instar) Antennae 5-jointed, the relative length of joints about as follows:

Wingless form: III-57, IV-16, V-53 (23+30).

Winged form: III-65, IV-20, V-57 (20+37).

Wing-pads preen. Eyes large, with small ocular tubercles. Cornicles cylindrical, moderately dilated on the distal half. Tubercle above the cauda slender. Cauda wider than long, conical.

Some wingless and a few winged viviparous females were collected in April and May, 1923, at Taihoku.

Cavariella neocapreae Takah. was collected by Mr. M. Kurisaki at Tadono, Wakayama-prefecture, Japan, in May. 1920.

Aphis petasiticola n. sp.

(Pl. IV, B, fig. 10)

Wingless viviparous female.

Blackish brown, not shining. In a specimen treated with caustic potash, some blackish patches and spots are visible on the dorsum.

Eyes and cornicles black. Antennae black, paler at the base of the 3rd joint. Femora black, with the bases pale brownish; tibiae pale brown, with black apices; tarsi black. Cauda blackish brown.

Body stout. Head provided with more than 10 long hairs on the dorsal surface. Frontal tubercles almost lacking. Eyes not very large when seen from above. Ocelli present, as in the winged form, but much smaller than those of the winged viviparous female. Antennae long, more slender than the tibia, somewhat stout, imbricated, provided with many very long rather fine hairs; the 3rd joint without sensoria, the 5th with a sensorium of small size; the relative length of joints as follows: III-95, IV-65, V-57, VI-100 (30+70). Rostrum reaching the hind coxae. Prothorax with a large blunt lateral tubercle. Abdomen reticulated on the dorsum, the 1st and 7th segments each provided with a blunt lateral tubercle, which is almost as large as that on the prothorax; a very small similar tubercle on each of the 2nd and 3rd segments; with a few very long hairs on the dorsum and many similar hairs on the ventral surface. Cornicles long and slender, cylindrical, scarcely or not curved, somewhat dilated toward the base, usually not dilated at the base, imbricated, not reticulated, almost as long as the 3rd antennal joint, nearly twice as long as the cauda. Cauda stout, more so than the cornicle, somewhat constricted about the middle, almost 1.5 times as long as the basal part of the last antennal joint. Legs very long, stout, furnished with many very long fine hairs; tibiae almost as stout as the cornicle at midlength; tarsi imbricated; hind tarsi almost as long as the basal part of the last antennal joint.

Length of body-about 2.2 mm. Antenna-about 1.75 mm.

Cornicle-about 0.45 mm.

It is a very remarkable fact that the wingless viviparous female, like the winged form, is provided with 3 ocelli which are small, but distinct. About 35 specimens that I have collected have these ocelli present. In some specimens the 3rd antennal joint is provided with about 5 very small circular sensoria scattered almost throughout the whole length, and the 4th with about 2 such sensoria.

Winged viviparous female.

Head, eyes, antennae, mesothorax and cornicles black. Cauda blackish brown. Abdomen dark brownish, with some blackish bands and spots visible on the dorsum in specimens treated with caustic potash. Wings hyaline; stigma gray; veins grayish brown. Legs mostly pale brownish. Head provided with about 10 long hairs. Frontal tubercles almost as in the wingless form. Ocelli larger than those of the wingless form. Antennae long, rather stout, imbricated, provided with some very long fine hairs; the 3rd joint provided with 25-30 circular sensoria of moderate to small size scattered almost over the whole length; the 4th with about 9-12 similar sensoria over the whole length not arranged in a single row; the 5th with 3 or 4 sensoria; the relative length of joints about as follows: III-90, IV-65, V-55, VI-100 (30+70). Rostrum reaching beyond the middle coxae. Tubercles on the prothorax and the abdomen as in the wingless form. Abdomen scarcely reticulated, provided with a few very long hairs on the dorsum and many on the ventral surface. Cornicles as in the wingless form, almost as long as the spur of the last antennal joint and almost twice as long as the cauda. Cauda almost as in the wingless form in shape, a little longer than the base of the last antennal joint, provided with many very long hairs.

Wings with normal veins; obliques on the hind wing parallel; hooklets 3 or 4. Legs very long, provided with many very long hairs; front tibiae almost as stout as the 3rd antennal joint; tarsi imbricated; hind tarsi almost as long as the base of the last antennal joint.

Length of body-about 2.2 mm. Antenna-about 1.7 mm.

Cornicle about 0.3 mm. Fore wing about 3.4 mm.

Host.-*Petasites tricholobus*. The lower sides of the leaves are attacked and the infested leaves are distinctly curled.

Distribution.-Formosa: Taihoku.

Many viviparous females were collected on February 25, 1923, by the author.

It is possible that the wingless form described above may prove to be an intermediate.

Aphis malvoides v. d. Goot?

Aphididae of Formosa, 2, pp. 37 and 103 (1923).

Nymph of viviparous female.

Key to instars.

(1) Antennae 4-jointed.....The 1st instar.

—— Antennae 5-jointed.....The 2nd instar.

—— Antennae 6-jointed.....(2)

(2) The 3rd antennal joint almost as long as the 4th.....The 3rd instar.

—— The 3rd antennal joint longer than the 4th.....The 4th instar.

(First instar) Yellowish green. Eyes dark reddish brown. Antennae pale yellowish, sometimes slightly dusky on the distal half. Cornicles pale yellowish, sometimes slightly dusky on the apical part. Cauda pale yellowish. Legs pale yellowish, apices of tibiae, and tarsi slightly dusky. Head very large, broad, provided with a pair of moderately long bristles on the anterior margin. Eyes somewhat protuberant, without ocular tubercles. Antennae much shorter than the body, 4-jointed, provided with a few short hairs; the 3rd joint scarcely imbricated, the 4th imbricated; the relative length of joints as follows: III-22, IV-35 (10+25). Rostrum stout, reaching slightly beyond the hind coxae. Prothorax and the 1st and 7th abdominal segments each provided with a very small blunt lateral tubercle, of which those on the prothorax are slightly larger than the others. Abdomen provided with a few short hairs; segments not well defined. Cornicles very short, somewhat imbricated, not dilated at the base, a little longer than wide, slightly shorter than the base of the 4th antennal joint. Cauda very short, almost semicircular when seen from above, wider than long, almost as long as the cornicle, provided with a pair of moderately long lateral bristles.

Legs stout, more so than the antenna; the front and middle pairs of tibiae provided with some rather short hairs, the hind tibiae with some very long bristles; hind tarsi longer than the cornicle, slightly longer than the base of the 4th antennal joint.

Length of body-about 0.6 mm. Antenna-about 0.3 mm.

(Second instar) Differs from the 1st in the following characters:

Head somewhat dusky. Cornicles and eyes almost black. Antennae 5-jointed, the relative length of joints about as follows: III-20, IV-13, V-40 (13+27). Rostrum reaching the middle coxae. Cornicles a little longer than wide as in the 1st instar, almost as long as the basal part of the last antennal joint. Cauda longer, provided with 5 bristles.

Length of body-about 0.73 mm. Antenna-about 0.4 mm.

(Third instar) Differs from the second instar about as follows:

Cauda and anal plate dusky. Ocular tubercles visible. Antennae 6-jointed, the 3rd and 4th joints sometimes poorly defined, the relative length of joints as follows: III-21, IV-19, V-13, VI-55 (17+38). Wing-pads beginning to appear, pale yellow in colour. Cornicles longer, cylindrical, not dilated at the base, almost as long as, or very slightly longer than, the base of the last antennal joint as in the second instar, about or slightly more than, twice as long as wide. Cauda longer, provided with 7 bristles.

Length of body-about 1.1 mm. Antenna-about 0.7 mm.

(Fourth instar) Wing-pads much longer, blackish in colour. The relative length of antennal joints as follows: III-32, IV-25, V-25, VI-65 (20+45). Cornicles longer, almost as long as the 4th antennal joint, about 2.5 times as long as wide. Cauda longer, provided with 9 bristles.

Length of body-about 1.2 mm. Antenna-about 0.8 mm.

The above description was made from specimens on *Bidens pilosa*. Some viviparous females, both winged and wingless, were observed on *Emilia sonchifolia* on November 9, 1922, near Taihoku.

Aphis miscanthi Takah.

Aphididae of Formosa, part 1, p. 55 (1921) and ibid., part 2, p. 108 (1923).

Wingless viviparous female.

Yellowish gray, dirty yellow or purplish. Head very small. Eyes very small, not distinctly protuberant, with ocular tubercles. Frontal tubercles as in *Aphis lambusae* Full. Antennae shorter than the body, slender, imbricated, 5-jointed, almost destitute of hairs; the 1st joint much larger than the 2nd; the 3rd much more slender than the tibia, without sensoria; the 4th with a small circular sensorium near the tip; the relative length of joints about as follows: III-60, IV-32, V-97 (20+77). Rostrum stout, reaching the middle coxae. Body provided with a few very small lateral tubercles which are longer than wide. Abdomen furnished with some long fine hairs on the posterior part. Cornicles very short, shorter than the cauda, almost as long as or slightly longer than the basal part of the last antennal joint, almost twice as long as wide, slightly dilated toward the base, not expanded at the base, narrowest near the tip, imbricated, not reticulated. Cauda stouter than the cornicle, constricted about midlength, almost as long as or shorter than the 4th antennal joint, provided with many long bristles. Legs long, rather stout, furnished with many long fine hairs; hind tarsi almost as long as the basal part of the last antennal joint.

Length of body-about 1.5 mm. Antenna-about 1.0 mm.

Host.-*Miscanthus spp.*, *Saccharum officinarum*.

Distribution.-Formosa. Japan.

Some wingless viviparous females of an aphis collected on the leaves of *Miscanthus sp.* at Tokyo, on June 14, 1923, seem to belong to this species, although they deffer somewhat from the Formosan specimens. This species is a synonym of Aphis sacchari Zehnt.

Anuraphis helichrysi (Kalt.)

Aphididae of Formosa-1, p. 59 (1921); Aphididae of Formosa-2, p. 112 (1923).

Full-grown nymph of winged viviparous female.

Head provided with a few long hairs. Frontal tubercles absent. Eyes with ocular tubercles. Antennae rather stout, with a few rather short hairs, 6-jointed; the 3rd joint very slightly or scarcely imbricated, almost as stout as the tibia; the 4th imbricated, shorter than the basal 2 joints taken together; the 5th with an apical sensorium of medium size; the relative length of joints as follows: III-39, IV-20, V-18, VI-51(14+37). Rostrum almost reaching the middle coxae. Thorax with a few moderately long stout hairs. Abdomen with a few moderately long hairs on the basal part and some very long stout bristles which are shorter than the cornicle on the distal part. Tubercles absent. Cornicles almost as in the wingless adult, stout, about 1.5 times as long as wide, expanded toward the base, not curved, not imbricated, longer than the 4th antennal joint.

Cauda short, wider than long, much wider than the cornicle, almost as long as the base of the last antennal joint, somewhat broadly rounded, with 3 pairs of long bristles. Legs with some very long bristles; tibiae more slender than the cornicle; tarsi imbricated; hind tarsi almost as long as the 4th antennal joint.

Length of body-about 1.4 mm. Antenna-about 0.7 mm.

Described from specimens collected on *Ageratum conyzoides*, which is the most favored host of this aphis. A few winged and wingless viviparous females were collected on *Bidens pilosa* L. on December 29, 1922, at Taihoku. Many wingless viviparous females were collected on the upper surface of the leaves of *Aster indicus?* by the writer at Kyoto, Japan, on June 3, 1923.

Anuraphis artemisiae n. sp.

(Pl. IV, B, figs. 5-9)

Cerosipha species, Takahashi, Aphididae of Formosa-2, p. 42 (1923).

Wingless viviparous female.

Green, slightly yellowish. Eyes almost black. Antennae, cornicles and cauda green. Legs pale green, tarsi slightly dusky.

Body almost as in *Anuraphis helichrysi* (Kalt.) in general appearance, but much smaller, without hairs. Head rather small, without hairs.

Frontal tubercles very short to virtually lacking, but the inner side much longer than the outer, and very slightly convex. Antennae short, very slender, more slender than the tibia, imbricated, 5 or 6-jointed, almost without hairs; the 1st joint much larger than the 2nd; the 3rd without sensoria; sensorium rather small; the relative length of joints as follows: III-40, IV-20, V-25, VI-48 (15+33). Eyes not large, with ocular tubercles. Rostrum reaching beyond the middle coxae. Body without dorsal and lateral tubercles. Cornicles subcylindrical, rather stout, slightly curved, slightly expanded toward the base, sometimes very slightly dilated on the distal half, very slightly or scarcely imbricated, not reticulated, almost 1.8 times as long as the cauda, more than thrice as long as wide at the base, a little longer than the 3rd and 4th antennal joints taken together. Cauda large and very stout, stouter than the cornicle, broadest at the base, gradually tapering, with the apex rounded, almost 1.5 times as long as wide, almost as long as the 3rd antennal joint, almost twice as long as the hind tarsi, provided with 3 pairs of long lateral bristles. Legs provided with some moderately long setae; femora as stout as the cornicle; tarsi imbricated; hind tarsi almost as long as the 4th antennal joint.

Length of body-about 1.3 mm. Antenna-about 0.5 mm.

Brownish individuals were found in February, 1923.

Winged viviparous female.

Head, eyes, antennae and mesothorax black. Prothorax yellowish brown, dusky on the notum. Abdomen yellowish brown, dusky on the dorsum. Legs pale brown, apical halves of femora, apices of tibiae, and tarsi blackish. Cornicles dusky. Cauda dark brownish. Wings hyaline, stigma and veins almost grayish brown.

Body oblong. Head provided with a few minute hairs. Frontal tubercles almost lacking. Eyes very large. Antennae slender, imbricated, 6-jointed, provided with a few minute hairs; the 1st joint much larger than the 2nd, the 3rd provided over the whole length with 12-18 large, circular or subcircular sensoria not arranged in a single row; the 4th with about 4-7 similar sensoria in a row; the 5th with the apical sensorium rather large; the relative length of joints as follows: III-75, IV-50, V-40, VI-82 (22+60). Rostrum almost reaching the middle coxae. Abdomen provided with a few hairs. Cornicles much smaller than those of the wingless

form, subcylindrical, slightly expanded at the base and on the distal portion, not curved, not stout, imbricated, not reticulated, almost as long as the 4th antennal joint, almost twice as long as the cauda and not reaching the base of the cauda.

Cauda much smaller than that of the wingless form, broadest at the base, tapering, almost as long as wide, without constrictions, stouter than the cornicle, the distal portion provided with 3 pairs of lateral bristles. Wings long; veins normal; obliques on the hind wing parallel; hooklets 3. Legs very long and slender; tibiae almost as stout as the 3rd antennal joint, slightly more slender than the cornicle, provided with many moderate or rather long setae; tarsi imbricated, hind tarsi almost as long as the cauda.

Length of body-about 1.4 mm. Antenna-about 1.3 mm.

Fore wing-about 2.5 mm.

Host.-*Artemisia capillaris*, attacking the lower and upper surface of the leaf and the stalk.

Distribution.-Formosa: Taihoku.

This aphis is not a typical *Anuraphis* and possibly belongs to *Aphidella* Theobald (Ent. Mth. Mag., 1923, p. 105).

In 1922, I observed two or three colonies of this species continuously from January to May, during which period many wingless viviparous females were produced, but the winged forms were extremely rare, only two individuals being collected on March 15. But in 1923, the winged viviparous females were numerous in February at Taihoku.

Hyalopterus chenopodii (Schrank)

(Pl. VI, B, figs. 1-8)

Aphis chenopodii, Schrank, Fauna Boica, II, p. 109 (1801); Kaltenbach, Die Pflanzenl. p. 107 (1843).

Brevicoryne chenopodii, Das, Memoirs Indian Mus., VI, 4, p. 183 (1918).

Wingless viviparous female.

Green. Head brownish. Eyes almost black. Cornicles and cauda green. Legs greenish, tarsi dusky. Abdomen without markings. Body oblong, slightly covered with powder. Head rather small, provided with a few short hairs. Frontal tubercles lacking. Eyes rather small, with distinct ocular tubercles. Antennae very short, imbricated, much more slender than the front tibia, provided with a few short hairs; the 3rd joint without sensoria, the 5th slightly shorter than the basal two joints taken together, with the sensorium rather small; the relative length of

joints as follows: III-42, IV-13, V-18, VI-54 (17+37). Rostrum reaching the middle coxae. Prothorax with a very small lateral tubercle. Abdomen provided with a few rather short bristles arranged in a transverse row on the dorsum of the segment. Cornicles very short, somewhat swollen about the middle, slightly or not dilated at the base, slightly more than twice as long as wide, not imbricated, not curved, almost as long as the hind tarsi, a little longer than the 5th antennal joint. Cauda stouter and longer than the cornicle, broadest at the base, gradually tapering, with the apex rounded, without distinct constrictions, about 1.3 times as long as the cornicle, shorter than the spur of the last antennal joint, provided with 5 or 6 bristles. Legs provided with some rather long bristles; hind tibiae almost as stout as the cornicle; tarsi rather slender, imbricated.

Length of body-about 1.8 mm. Antenna-about 0.75 mm.

Winged viviparous female.

Antennae slender, imbricated, with a few very short hairs; the 3rd joint provided with from 10-12 large to small subcircular sensoria arranged in a row over the whole length, the 4th without sensoria, the 5th with the sensorium of moderate size; the relative length of joints about as follows: III-74, IV-24, V-27, VI-90 (20+70). Fore wings with the 3rd oblique twice forked; hind wings with only one oblique in the two specimens in my collection; hooklets 2.

Cornicles almost as in the wingless form, but shorter, almost twice as long as wide, nearly as long as the base of the last antennal joint. Cauda about 1.6 times as long as the cornicle. Legs long and slender, provided with many moderate to rather long bristles; hind tarsi as long as the cauda.

Length of body-about 1.5 mm. Antenna-about 1.1 mm.

Fore wing-about 2.2 mm.

Full-grown nymph of winged viviparous female.

Eyes large, with distinct ocular tubercles. Antennae stout, 6-jointed, provided with a few short hairs; the 3rd joint slightly imbricated on the distal half, the 4th almost as long as the 2nd, imbricated, the 5th with the sensorium small, the relative length of joints as follows: III-43, IV-10, V-15, VI-52 (15+37). Cornicles almost as in the adult of winged female, twice as long as the 4th antennal joint. Cauda short and stout, broadly conical, with the apex rounded, almost as long as wide, almost as long as the cornicle, much shorter than the hind tarsi, much stouter than the cornicle, provided with 3 pairs of bristles. Legs stout; hind tibiae almost as stout as the cornicle, provided with some moderate to very long bristles.

Length of body-about 1.5 mm. Antenna-about 0.7 mm.

Winged male.

Antennae imbricated, provided with a few short hairs; the 3rd joint provided with about 18 very large and small subcircular sensoria scattered over the whole length, the 4th with 4-6 rather small circular sensoria not arranged in a single row, the 5th with 5-10 similar sensoria, the 6th with about 2 on the basal part; the relative length of joints about as follows: III-70, IV-30, V-33, VI-90 (20+70). Hind wings with only one oblique in the only specimen in my collection; hooklets 2. Cornicles smaller than those of the female, nearly twice as long as wide, much shorter than the base of the last antennal joint. Cauda shorter and stouter than that of the female. Legs slender, provided with some rather long bristles; hind tarsi slightly shorter than the 4th antennal joint.

Length of body-about 1.25 mm. Antenna-about 1.2 mm.

Fore wing-about 1.7 mm.

Host.-*Chenopodium album*, attacking the upper side of the leaf.

Distribution.-Formosa: Taihoku.

India (Das); North America.

Hitherto unrecorded from Formosa.

Some wingless and two winged viviparous females and their nymphs and a winged male were collected on March 26, 1923, near Taihoku, by the author. No oviparous females were discovered.

The Formosan specimens differ somewhat from the description of Das.

Brachycolus heraclei Takah.

Aphididae of Formosa-1, p. 60 (1921); Aphididae of Formosa-2, p. 112 (1923).

Nymph.

(The first instar). Green. Head slightly dusky. Eyes black. Antennae and legs dusky. Cauda green. Cornicles slightly dusky. Body oblong, a little more than twice as long as wide, covered with a very slight powder, almost without hairs. Head provided with a few minute setae. Frontal tubercles lacking. Eyes slightly protuberant, with the ocular tubercles very small. Antennae very short, much shorter than the body, almost as long as the hind tibia and tarsi taken together, 4 or 5-jointed, provided with a few very small hairs; the 1st joint much larger than the second; the 3rd slightly imbricated, the sensorium small; the 4th imbricated; the relative length of joints as follows: III-20, IV-20 (8+12). Rostrum almost reaching the hind coxae. Body without lateral tubercles Abdomen provided with a few minute setae. Cornicles very short, wider than long, somewhat expanded toward the base, not imbricated.

Cauda very short, much wider than long, broadly rounded, with a pair of long bristles.

Legs rather stout; tibiae stouter than the antenna, provided with a few moderately long to rather short setae; hind tibiae with some very long bristles; tarsi scarcely imbricated, hind tarsi almost as long as the 3rd antennal joint.

Length of body-about 0.75 mm.

(Full-grown nymph of winged viviparous female). Green. Head somewhat dusky. Eyes black. Antennae pale brownish, blackish on the distal part. Thorax yellowish green. Wing-pads dusky. Cornicles dusky green. Cauda green. Legs almost pale brown, apices of tibiae, and tarsi dusky. Head somewhat protruding at the middle of the front, provided with a few rather long hairs. Frontal tubercles absent. Eyes with small ocular tubercles. Antennae stout, 6-jointed, with a few moderately long to short hairs; the 3rd joint slightly imbricated, stouter than the tibia; the 4th imbricated, shorter than the basal two joints taken together; the 5th with a rather small apical sensorium; the relative length of joints as follows: III-52, IV-20, V-16, VI-58 (16+42). Rostrum reaching almost the middle coxae. Prothorax with a small blunt tubercle on either side near the hind margin; abdomen without tubercles. Thorax and abdomen provided with a few rather short hairs. Cornicles very short, somewhat longer than wide, somewhat curved, scarcely imbricated, not constricted, very slightly or not expanded toward the base. Cauda when seen from above almost triangular, with the apex rounded, wider than long, almost as long as the 4th antennal joint, with 4 pairs of long bristles. Legs furnished with many long bristles; hind tarsi much longer than the 4th antennal joint.

Length of body-about 1.2 mm. Antenna-about 0.75 mm.

The cornicles of the young nymph are wider than long, not curved and somewhat expanded toward the base.

The above description was made from specimens on *Heracleum sp.* A few wingless viviparous females were found on the curled leaves of *Daucus carota* (Umbelliferae) on February 20, 1923, near Taihoku. Many viviparous females, both winged and apterous, and a few winged males were collected on *Coriandrum sativum* on December 23, 1923, at Taihoku, but no oviparous females were discovered at this time.

Brachysiphoniella gramini Takah.

(Pl. IV, A, figs. 2-5)

Aphididae of Formosa, part 1, p. 62 (1921) and part 2, pp. 43 and 113 (1923).

Winged viviparous female.

Head, eyes, antennae, thorax, cornicles and cauda black. Abdomen black, slightly greenish. Wings hyaline; stigma gray; veins dusky. Femora mostly black, paler at the bases; tibiae mostly brownish, with black apices; tarsi black. Body stout, covered quite slightly with a powder. Head with about 8 moderately long bristles on the dorsal surface. Eyes very large, but not markedly protuberant, with very small ocular tubercles. Frontal tubercles almost lacking. Antennae rather stout, almost without hairs; the 3rd joint provided with about 25-30 protuberant, rather large, circular sensoria scattered over the whole length; the 4th with about 22 similar sensoria; the 5th somewhat imbricated, with about 6-13 sensoria; the 6th imbricated; the relative length of joints about as follows: III-49, IV-39, V-39, VI-73 (25+48). Rostrum stout, not reaching the middle coxae. Abdomen without tubercles, provided with a few bristles on the dorsum, and with many short bristles on the ventral surface of each segment. Wings with the veins normal; hind wings with 2 slightly divergent obliques; hooklets 2 or 3. Cornicles almost as in the wingless form. Cauda long, more slender than that of the wingless form, much longer than the cornicle, longer than the basal part of the last antennal joint, about 1.5 times as long as the hind tarsi, with 2 or 3 pairs of rather short lateral bristles. Legs provided with many moderately long setae; hind tarsi almost as long as the basal part of the last antennal joint.

Length of body-about 1.4 mm. Antenna-about 1.05 mm.

Fore wing-about 2.2 mm.

The specimens here described differ from those previously described in possessing more sensoria on the antennae.

Full-grown nymph of winged viviparous female.

Head furnished with a few rather short bristles. Eyes large, not protuberant, with small ocular tubercles. Antennae rather stout, with a few short hairs; the 4th joint very slightly imbricated; the 5th more slender than the 4th, somewhat imbricated, with a very small apical sensorium; the relative length of joints as follows: III-44, IV-34, V-38, VI-70 (23+47). Rostrum very stout, not reaching the middle coxae. Wing-pads black. Abdomen with some bristles on the ventral surface. Cornicles almost as long as wide, slightly tapering. Cauda somewhat triangular when seen from above, with the apex rounded, as long as wide, almost as long as the base of the last antennal joint, somewhat longer than the hind tarsi, slightly more than twice as long as the cornicle, with some moderately long bristles. Legs stout; tibiae as stout as the 3rd antennal joint, provided with a few moderately long setae and some long bristles.

Length of body-about 1.2 mm. Antenna-about 1.0 mm.

Host- *Leersia hexandra*, attacking the upper surface of the blade.

Distribution.-Formosa: Taihoku, Tainan.

Japan: Tokyo.

Described from specimens collected on January 18, 1923, at Taihoku.

Cryptosiphum artemisiae Buckt.

Aphididae of Formosa-2, pp. 43 and 112 (1923).

syn. *Pseudolachnus yomogi*, Shinji, Dobutsugaku-Zasshi, xxxiv, no. 406, p. 730 (1922).

Wingless viviparous female.

Dark purplish, somewhat covered with powder. Body very wide. Head small, with a few short hairs. Frontal tubercles lacking. Eyes small, composed of less than 40 facets, the ocular tubercles not distinctly protruding. Antennae short, imbricated, more slender than the tibia, provided with a few short setae; the 1st joint somewhat shorter than the 2nd; the 3rd without sensoria; the 4th almost as long as the 2nd, the 5th somewhat narrowed toward the base, with an apical sensorium of medium size; the relative length of joints as follows: III-34, IV-13, V-15, VI-37 (18+19). Rostrum reaching the middle coxae. Body lacking tubercles. Abdomen with a few rather short hairs arranged in a single row on the segment; those on the distal segments much longer. Cornicles very short, almost like pores. Cauda short, much shorter than wide, broadly rounded, with 4 bristles. Legs rather short, slender; tibiae provided with some moderately long setae; tarsi somewhat imbricated; hind tarsi shorter than the 3rd antennal joint.

Length of body-about 1.4 mm. Antenna-about 0.55 mm.

Winged viviparous female.

Head provided with about 8 very short hairs on the dorsal surface. Frontal tubercles lacking. Eyes not very large, with ocular tubercles. Anterior ocellus protuberant. Antennae slender, as stout as or more slender than the front tibia, imbricated, with a few short hairs; the 2nd joint longer than the 1st; the 3rd provided with 7-12 large or small circular to subcircular sensoria mostly on the

distal half not arranged in a single row; the 4th without sensoria; the 5th somewhat narrowed toward the base, with the apical sensorium large; the relative length of joints about as follows: III-55, IV-23, V-20, VI-48 (21+27). Rostrum reaching the middle coxae. Body without tubercles. Abdomen furnished with a few rather short bristles. Cornicles very short, much wider than long. Cauda almost semicircular when seen from above, much wider than long, broadly rounded, shorter than the hind tarsi, with 4 rather long bristles. Wings somewhat clouded along the veins; veins normal; hind wings with 2 almost parallel obliques; hooklets 2 or 3. Legs slender; tibiae provided with many moderately long setae; tarsi imbricated; hind tarsi almost as long as the 4th antennal joint.

Length of body-about 1.0 mm. Antenna-about 0.8 mm.

Fore wing-about 1.8 mm.

Full-grown nymph of winged viviparous female.

Head straight on the front, with 8 short hairs on the dorsal surface. Frontal tubercles lacking. Eyes not large, with the ocular tubercles indistinct. Antennae 6-jointed, with a few short hairs; the 1st joint somewhat shorter than the 2nd; the 3rd scarcely imbricated, almost as stout as or slightly more slender than the tibia, lacking sensoria; the 4th imbricated, somewhat expanded toward the apex, shorter than the basal two joints taken together; the 5th expanded toward the apex, with an apical sensorium of medium size; the relative length of joints as follows: III-34, IV-14, V-14, VI-36 (15+21). Rostrum reaching the middle coxae. Body without lateral tubercles. Abdomen with a few short setae arranged in a single row on the dorsum of the segments. Cornicles very short, each slightly more than a pore. Cauda much wider than long, broadly rounded, with 4 bristles. Legs moderately long; tibiae provided with some moderately long setae; hind tibiae much shorter than the antenna; tarsi slightly imbricated; hind tarsi almost as long as the spur of the last antennal joint, longer than the cauda.

Length of body-about 1.1 mm. Antenna-about 0.55 mm.

Described from specimens collected in the galls on *Artemisia capillaris* on January 23, 1923, at Taihoku.

The winged viviparous females collected on *Artemisia vulgaris* var. *indica* on June 26, 1921, near Taihoku and on November 10, 1922, at Shinchiku, Formosa, differ from those on *Artemisia capillaris* in having more sensoria on the 3rd and from 1-3 sensoria on the 4th antennal joint.

Many winged and wingless viviparous females were collected at Yamashina, near Kyoto, Japan, on June 3, 1923, by the author.

Greenidea tenuicorpus (Oka.)

Trichosiphum tenuicorpus, Okajima, Bull. Coll. Agr., Imp. Univ. Tokyo, VIII, 1, p. 4 (1908).

Host in Formosa.-*Castanopsis subacuminata*, attacking the lower side of the young leaf.

Distribution.-Formosa: Botan and Kusukusu in Koshun.

Japan: Tokyo, Oita-prefecture.

Hitherto unrecorded from Formosa.

Many viviparous females, both winged and wingless, were collected by the author in Koshun, Formosa, on November 25, 1923. These Formosan specimens agree exactly with those from Japan.

Greenidea formosana (Maki).

(Pl. III, B, figs. 1-5)

Trichosiphum formosanum, Maki, Collection of Essays for Nawa, p. 13 (1917).

Greenidea formosana, Takahashi, Aphididae of Formosa, pt. 1, p. 65 (1921) and pt. 2, p. 115 (1923).

Nymph of viviparous female.

Key to instars.

(1) Antennae 5-jointed; cornicles conical, without hairs; the 7th and 8th abdominal segments each provided with 2 distinct tubercles.....The 1st instar.

—— Antennae 5 or 6-jointed; cornicles provided with many long bristles; the 7th and 8th abdominal segments without tubercles.....(2)

(2) Cornicles about 4 times as long as wide.....The 2nd instar.

—— Cornicles about 5 times as long as wide in the wingless form; wing-pads beginning to appear in the winged form.....The 3rd instar.

—— Cornicles about 6 times as long as wide in the wingless form, but longer and slender, with well developed wing-pads in the winged form.....The 4th instar.

(The first instar) Head pale yellowish. Eyes dark brown. Antennae pale yellowish, the last joint very slightly dusky. Thorax pale yellowish, very slightly dusky on the dorsum, except on the middle, of the meso-and metathorax. Abdomen reddish yellow, with a pair of large black patches, the mesal edges of which are often united, on the middle of the dorsum. Cornicles blackish. Cauda pale yellow. Legs pale yellowish, dusky on the tarsi.

Body oblong, provided with many very long stout bristles which are not capitate. Head fused with the pronotum, provided with about 20 very long bristles which are almost as long as the 1st antennal joint. Frontal tubercles lacking. Eyes somewhat protuberant; ocular tubercles present, but not protuberant. Antennae rather stout, imbricated, 5-jointed; the 3rd joint almost as stout as, or slightly more slender than, the front tibia, without hairs; the 4th almost as long as the 2 basal joints taken together, furnished with about 2 very long bristles, the sensorium subcircular, rather small; the 5th provided with 2 very long stout bristles; the relative length of joints about as follows: III-32, IV-24, V-95 (25+70). Rostrum long and slender, reaching far beyond the hind coxae. Each of the basal 6 abdominal segments furnished with 6 very long stout bristles arranged in a transverse row on the dorsum. Some bristles on the abdomen with a few very short branchlets on the apical portion. Cornicles very peculiar in shape, very short, stout, tuberculate, almost twice as long as wide, distinctly tapering on the distal half, with the apex pointed though not sharply so, not dilated at the base nor swollen, not imbricated nor reticulated, without hairs; almost as long as the bristle on the abdomen, slightly longer than the hind tarsi, very slightly longer than the 4th antennal joint, about 2.5 times as long as the tubercle on the 7th abdominal segment.

The 7th abdominal segment on the side provided with a distinct tubercle, which is much smaller than the cornicle, almost twice as long as wide, and provided with a very long bristle arising from the apex; the 8th provided with a pair of similar, but more slender tubercles on the middle of the dorsum. Caudal segment wider than long, much wider than the cornicle, very slightly protuberant at the middle of the hind margin, with a pair of rather long bristles. Anal plate moderately sinuated. Legs stout, furnished with many very long stout bristles; femora stouter than the cornicle; tarsi imbricated; hind tarsi almost as long as the base of the last antennal joint.

Length of body-about 1.0 mm. Antenna about 0.8 mm.

(The second instar) Head pale yellowish. Eyes dark brown. Antennae pale yellowish, the last jont somewhat dusky. Thorax pale yellowish, the dorsum slightly dusky, except at the middle of the meso-and metathoraces. Abdomen reddish brown, with a large black patch on the middle of the dorsum. Cornicles dusky, darker at the apex. Cauda pale yellow. Legs pale brownish, dusky on the apices of tibiae, and tarsi.

Morphological characters: Differs from the first instar in the following characters:

Eyes more protuberant, with the ocular tubercles likewise protuberant. Antennae 6-jointed; the 3rd joint sometimes fused with the 4th, provided with some long bristles; the 4th and 5th with more bristles; the relative length of joints as follows: III-35, IV-23, V-34, V-125 (33+92). Thorax and abdomen furnished with more bristles. Cornicles stout, larger, somewhat swollen near midlength, almost as stout as the hind femur, not dilated at the base, about 4 times as long as wide, somewhat longer than the 3rd and 4th antennal joints taken together, provided with many very long stout bristles, the apical portion provided with numerous minute spinules. Abdominal segments without tubercles. Caudal segment a little protruding at the middle of the hind margin, with 6 very long bristles. Anal plate less sinuated. Hind tarsi shorter than the base of the last antennal joint.

Length of body-about 1.25 mm. Antenna-about 1.25 mm.

(The third instar) Head and pronotum dusky. Eyes dark red. Antennae pale yellowish, the last joint somewhat dusky. Meso-and metathoraces pale yellowish, dusky on the notum except at the middle. Abdomen reddish brown, with a large blackish patch on the middle, a large dark brown patch on the dorsum near the end, 4 rather large pale dusky patches on the side, and many small dusky spots on the dorsal surface, from which bristles arise. Cornicles blackish brown, darker at the base and the apex. Legs yellowish brown, darker at the apices of tibiae; tarsi black. Cauda pale brown. Morphological characters: differs from the second in the following characters:

Body provided with more bristles each arising from a small dusky spot. Antennae 6-jointed; the relative length of joints as follows: III-50, IV-30, V-40, VI-140 (40+100). Cornicles almost as in the second instar, but longer, almost 5 times as long as wide, almost as long as the 3rd and 4th antennal joints taken together. Anal plate rather slightly sinuated.

Length of body-about 1.4 mm. Antenna-about 1.5 mm.

(The fourth instar)

(Wingless form) Colour almost as in the third instar. Abdomen with the middle part dark greenish.

Antennae longer; the relative length of joints about as follows: III-65, IV-37, V-50, VI-160 (45+115). Cornicles longer, about 6 times as long as wide. Caudal segment with more bristles.

Length of body-about 1.7 mm. Antenna-about 1.7 mm.

Differs from the wingless adult in the following characters:

Colour not dark brown. Antennae shorter. Cornicles shorter. Caudal segment with a shorter process.

(Winged form) Head and pronotum black. Eyes dark brown. Antennae almost black, somewhat brownish on the 3rd joint. Mesothorax pale greenish or yellowish, with black wing-pads. Abdomen pale brownish or purplish, dusky or dark greenish on the middle, with 4 rather large dusky patches on the sides, many small dusky spots on the dorsum and a dusky patch present on the dorsum near the end. Cornicles yellowish brown, blackish on the base and the apex. Cauda pale yellowish. Legs yellowish brown, blackish on the apices of tibiae, and tarsi.

Body oblong, provided with many very long stout hairs arising from very small dusky spots. Head and pronotum fused together. Frontal tubercles almost lacking. Eyes protuberant, with the ocular tubercles prominent. Antennae rather stout, imbricated; with many very long stout bristles; sensorium of moderate size; the relative length of joints about as follows: III-90, IV-48, V-60, VI-175 (50+125). Rostrum slender, reaching far beyond the hind coxae. Mesothorax well developed. Wing-pads rather short. Some bristles on the abdomen slightly branched at the apex. Spiracles somewhat protuberant. Cornicles very long and slender, very slightly curved, very slightly tapering on the distal portion, not dilated nor swollen, reticulated, provided with many very long bristles which are longer than those on the abdomen, the apical part with numerous minute hairs, almost as long as the last antennal joint. Caudal segment wider than long, much wider than the cornicle, with a distinct process, provided with some very long stout bristles. Anal plate scarcely sinuated. Legs long and slender, provided with many very long bristles; femora almost as stout as the cornicle; tibiae more slender than the 3rd antennal joint; tarsi imbricated; hind tarsi a little longer than the caudal segment, but much shorter than the base of the last antennal joint.

Length of body-about 1.8 mm. Antenna-about 2.0 mm.

Cornicle-about 0.8 mm.

Described from specimens collected on February 28, 1923, at Taihoku. Some viviparous females were observed in November, 1923, at Kuraru and Garambi, Koshun, Formosa.

Myzocallis pseudoalni Takah.

Aphididae of Formosa-1, p. 71 (1921); Aphididae of Formosa-2, p. 121 (1923).

Nymph.

Key to the instars.

(1) Antennae 4-jointed.....The 1st instar.
— Antennae 5-jointed.....The 2nd inster.
— Antennae 6-jointed.....(2)
(2) Wing-pads not well developed.....The 3rd instar.
— Wing-pads well developed.....The 4th instar.

(The first instar) Pale yellowish green. Eyes red. Antennae pale yellow, with the apex of the 3rd joint and the 4th very slightly dusky. Legs pale yellow; tarsi slightly dusky. Cornicles and cauda yellowish. Hairs blackish brown. Body oblong, broadest at the midlength of the abdomen, nearly twice, or slightly more than twice, as long as wide, about 1.5 times as long as the antenna, provided with many very long stout hairs arising from very small tubercles on the dorsum; these hairs almost as long as, or slightly longer than, the 1st antennal joint, scarcely or very slightly capitate. Head large, provided with 3 pairs of long hairs between the antennae and 4 similar hairs arranged in a transverse row between the eyes. Eyes somewhat protuberant, without ocular tubercles. Frontal tubercles quite short. Antennae 4 jointed; the 1st joint larger than the 2nd, provided with a long hair; the 2nd likewise provided with a long hair; the 3rd more slender than the front tibia, provided with many minute spinules, and a long bristle near the apex, the sensorium rather small; the 4th longer than the basal two joints taken together, provided with minute spinules, a moderately long bristle below the sensorium, and a few similar ones at the tip; the relative length of joints as follows: III-43, IV-30 (154-15). Rostrum reaching the middle coxae. Prothorax provided with a pair of somewhat shorter hairs on the middle of the dorsum, behind which are 4 long hairs arranged in a transverse row.

Each meso-and metathoracic segment and the first seven abdominal segments provided with 4 long hairs arranged in a transverse row on the dorsum; of these hairs the middle two on the 1st and 4th abdominal segments are often shorter; the 8th abdominal segment with a pair of longer hairs on the dorsum. Abdomen without finger-like tubercles. Cornicles very short, much wider than long.

Cauda much wider than long, broadly rounded, not constricted at the base, almost semicircular when seen from above, without hairs. Anal plate not bilobed, with a pair of long bristles.

Legs stout, provided with some moderate to rather long bristles; hind tibiae

somewhat longer than the 3rd antennal joint, with some very long bristles; hind tarsi almost as long as either the base of the last antennal joint or the hairs on the 8th abdominal segment.

Length of body-about 0.65 mm.

(The second instar) Colour almost as in the first instar; apices of antennal joints dusky. Body provided with many very long stout hairs, which are scarcely or slightly capitate, arising from very small tubercles on the dorsum. Head provided with 10 very long hairs which are much longer than the 1st antennal joint and distributed as in the first instar. Eyes without ocular tubercles. Frontal tubercles as in the 1st instar. Antennae 5-jointed; each of the 1st and 2nd joints provided with a long scarcely capitate hair which is almost as long as the 1st joint itself; the 3rd almost as long as, but more slender than, the front tibia, provided with a few minute spinules on the distal portion, 2 moderately long or short slightly knobled hairs, and about 3 short bristles; the 4th provided with many minute spinules, and a moderately long stout hair at about midlength, the sensorium of medium size; the 5th provided with a moderately long hair below the sensorium and a few rather short bristles at the tip; the relative length of joints as follows: III-49, IV-27, V-40 (20+20). Rostrum almost reaching the middle coxae. Prothorax having the dorsum provided with 6 long hairs distributed as in the 1st instar. Mesonotum provided with 6 hairs distributed almost as on the pronotum, the front pair somewhat shorter. Metanotum and each of the first 3 abdominal segments provided with 4 long hairs on the middle of the dorsum and 2 similar ones near each side, these hairs being arranged in a transverse row; the 4th abdominal segment with about 10 long hairs; the 5th with 6, the 6th with 4, the 7th with 4-6, and the 8th with 4 long hairs.

Cornicles wider than long, somewhat constricted about midlength, scarcely expanded at the base. Cauda longer than that of the 1st instar. Legs almost as in the 1st instar.

Length of body-about 0.9 mm. Antenna-about 0.65 mm.

The second instar differs from the first in the following characters:

Antennae 5-jointed. The 3rd antennal joint provided with 2 somewhat knobbed hairs. Meso-and metanotum and abdomen provided with more hairs.

(The third instar) Colour almost as in the younger nymph, sometimes green in its general colour. Body provided with many very long stout hairs which are scarcely or very slightly knobbed, much longer than the 1st antennal joint, and

arising from very small tubercles. Head provided with 10 hairs distributed as in the 1st and 2nd instars. Eyes with small ocular tubercles. Frontal tubercles as in the younger nymph. Antennae 6-jointed, provided with many minute spinules on the 4th and the following joints; the 1st and 2nd joints each provided with a very long slightly knobbed hair which is longer than the 1st antennal joint, but shorter than those on the head, arising from a very small tubercle; the 3rd much shorter than the front tibia, provided with 2 very long and 2 moderately long slightly knobbed stout hairs arising from very small tubercles arranged in a row; the 4th and 5th provided with a few moderately long to rather short bristles, the sensorium subcircular and of medium size; the 6th provided with a moderately long bristle far below the sensorium; the relative length of joints as follows: III-51, IV-40, V-41, VI-55 (25+30). Rostrum not reaching the middle coxae. Prothorax provided with 6 very long hairs distributed as in the 1st and 2nd instars on the pronotum and a very small blunt lateral tubercle near the hind margin. Mesothorax somewhat protruding on the sides, provided with 8 long hairs arranged in two transverse rows on the middle of the dorsum and a similar one near either side. Metathorax slightly protruding on the sides, with 4 long hairs on the middle of the dorsum and two similar ones near either side, these hairs arranged in a transverse row like those on the abdominal segments. The 1st abdominal segment provided with 8 hairs as on the metanotum; the 2nd, 3rd and 4th each with 10, the 5th and 6th each with 4 at the middle and one near either side, and the 7th and 8th each with about 6 hairs; certain of these hairs sometimes much shorter. Cornicles and cauda almost as in the 2nd instar, much shorter than the hairs on the body. Legs stout, provided with moderate to very long normal bristles which are shorter than the hairs on the abdomen.

Length of body-about 1.5 mm. Antenna-1.0 mm.

Differs from the 2nd instar in the following characters:

Antennae 6-jointed. The 3rd antennal joint shorter than the front tibia, provided with more numerous long stout hairs. Eyes with very small ocular tubercles. Prothorax provided with a very small lateral tubercle. Wing-pads beginning to appear. Rostrum not reaching the middle coxae. Mesonotum and abdomen provided with more hairs.

(The fourth instar) Colour almost as in the third instar, sometimes dark brownish purple on the middle of the meso-and metanota and with a pair of longitudinal dark brownish purplish patches, which are sometimes interrupted, on the

dorsum of the abdomen.

Body provided with many very long scarcely or very slightly knobbed hairs arising from very small tubercles on the dorsal surface, lacking finger-like tubercles, as in the younger nymph. Head provided with 10 very long hairs which are a little shorter than the basal two antennal joints taken together, very slightly or scarcely capitate, and distributed on the dorsal surface as in the younger nymph. Frontal tubercles almost lacking. Eyes with very small ocular tubercles. Antennae 6-jointed, provided with some minute spinules on the distal portions of the 3rd, 4th and 5th joints and on the 6th; the 1st, as well as the 2nd, provided with a long very slightly capitate hair arising from a very small tubercle; the 3rd much shorter than the front tibia, provided with about 4 very long slightly capitate hairs arising from very small tubercles arranged in a row and a few moderately long normal bristles; these hairs shorter than those on the head; the 4th and 5th with a few moderately long bristles, without capitate hairs, the sensorium circular and of medium size; the 6th with a bristle below the sensorium; the relative length of joints about as follows: III-95, IV-64, V-60, VI-65 (30+35). Rostrum not reaching the middle coxae. Prothorax provided with a very small blunt tubercle on either side near the hind margin, and 6 very long stout hairs on the notum distributed as in the young nymph. Mesothorax large, with the wing-pads well developed, provided with 10 long hairs on the dorsal surface, distributed as in the 3rd instar. Metathorax and the 1st abdominal segment each provided with 4 long hairs on the middle and 2 similar ones near either side; these hairs arranged in a transverse row as on the other abdominal segments; the 2nd, 3rd and 4th abdominal segments each provided with 6 hairs on the middle and 2 near the sides; the 5th, 6th and 7th each with 4 or 5 hairs on the middle and 1 near the sides; the 8th with 6 hairs. Cornicles much shorter than the hairs on the abdomen, longer than wide at midlength, somewhat expanded at the base and somewhat constricted near the middle. Cauda wider than long, broadly rounded, without hairs. Anal plate not bilobed. Legs long and stout; tibiae provided with some long bristles; hind tarsi longer than the cornicle, but slightly shorter than the base of the last antennal joint.

Length of body-about 2.0 mm. Antenna-about 1.5 mm.

The fourth instar differs from the third in the well-developed wing-pads. These descriptions were made from specimens collected in February, 1923, at Taihoku, Formosa. The legs of the nymph, like the adult, are provided with two limpid hairs between the claws.

The number of hairs on the dorsal surface of the body of the nymph of *Myzocallis pseudoalni* Takah.

	First instar	Second instar	Third instar	Fourth instar.
Head	10	10	10	10
Pronotum	6	6	6	6
Mesonotum	4	6	10	10
Metanotum	4	8	8	8
First abd. seg.	4	7- 8	8	8
Second „ „	4	8	10	10
Third „ „	4	8	10	10
Fourth „ „	4	9-10	9-10	9-10
Fifth „ „	4	5- 6	6	6- 7
Sixth „ „	4	4	6	6- 7
Seventh „ „	4	4- 6	6	6- 7
Eighth „ „	2	4	6	6

Myzocallis bambusifoliae Takah.

Aphididae of Formosa, part 1, p. 73 (1921) and part 2, p. 128, pl. II, B, fig. 6 (1923).

Winged viviparous female.

Antennae covered with a few cottony secretions as in *Myzocallis arundicolens* Clark. The basal 8 abdominal segments each provided with a pair of small oblong dusky spots at the middle of the dorsum. A very small blunt tubercle, which is provided with a rather short hair at the apex, arising from the hind part of each dusky spot on the dorsum.

Myzocallis arundinariae Essig, *M. arundicolens* Clark. and *M. bambusifoliae* Takah. are very closely related to one another, but are distinguishable as follows:

(1) Abdomen with dusky markings on the dorsum.....(2)

—— Abdomen without dusky markings on the dorsum. (The 3rd antennal joint with the apex and a band near the base black).....*arundicolens* Clark.

(2) The 3rd antennal joint black throughout.....*arundinariae* Essig.

—— The 3rd antennal joint black at the apex and the base...*bambusifoliea* Takah.

A few winged viviparous females of *M. bambusifoliae* Takah. were collected by Mr. M. Kurisaki at Tadono in Wakayama-prefecture, Japan. Hitherto unknown from Japan.

Myzocallis formosanus n. sp.

(Pl. X, A, fig. 3)

Winged viviparous female.

Yellow. Eyes red. Antennae black. Frontal tubercles dusky. Head and prothorax each with a broad longitudinal dusky stripe on the dorsum. Mesothorax darker, with a few dusky stripes. Most of the abdominal segments with a pair of dusky markings on the dorsum. Cornicles, cauda and anal plate somewhat dusky. Legs dusky. Wings hyaline, sometimes slightly dusky, scarcely clouded along the veins. (Colour notes from specimens preserved in alcohol). Body oblong, with a few short hairs. Head somewhat protruding above the front ocellus, with a pair of inconspicuous blunt tubercles between the frontal tubercles, from each of which a short hair arises. Frontal tubercles very short. Eyes normal. Antennae long and very slender, with a few very small hairs; the 1st joint much larger than the 2nd; the 3rd furnished with 3-5 rather small to medium-sized oval sensoria arranged in a single row near the base; the 4th without sensoria; the relative length of joints about as follows: III-110, IV-77, V-69, VI-84 (43+41). Rostrum very short, reaching the front coxae. Abdomen without distinct tubercles.

The 2nd oblique on the front wings somewhat curved; the 3rd normal; stigmatic vein somewhat obsolete; hind wings with 2 slightly divergent obliques; hooklets 2. Cornicles very short, much shorter than wide at midlength, somewhat expanded at the base. Cauda constricted at the base, with some very long bristles. Anal plate bilobed, with some very long bristles. Legs slender, with many moderate to rather long bristles; tibiae stouter than the 3rd antennal joint; hind tarsi slightly shorter than the basal two antennal joints taken together.

Length of body-about 2.0 mm. Antenna-about 1.8 mm.

Fore wing-about 2.5 mm.

Host.-*Arundinaria sp.*, attacking the lower surface of the leaf.

Distribution-Formosa.

Some viviparous females were collected by the author on December 2, 1923. This species differs from *Myzocallis arundinariae* Essig and its allies in the following characters:

(1) Head protruding above the front ocellus, with a pair of inconspicuous blunt tubercles between the frontal tubercles.
(2) Cornicles shorter.
(3) Legs dusky.

This aphis is distinguishable from *M. sasae* Mats. by the antennal structure.

Callipterus kahawaluokalani (Kirk.)

Aphididae of Formosa-1, p. 74 (1921 ; Aphididae of Formosa-2, p. 44 and 125 (1923).

Nymph of viviparous female.

Key to instars.

(1) Antennae 4-jointed; one pair of hairs on the front of the head scarcely or not at all capitate.....The 1st instar.
—— Antennae 5 or 6-jointed; all the hairs on the head capitate.....(2)
(2) Wing-pads lacking; antennae 5-jointed; eyes almost without ocular tubercles.....The 2nd instar.
—— Wing-pads present; antennae 6-jointed; eyes with very small ocular tubercles.....(3)
(3) Wing-pads not well developed; the 4th or 5th antennal joint almost as long as the base of the 6th.....The 3rd instar.
—— Wing-pads well developed; the 4th or 5th antennal joint a little longer than the base of the 6th.....The 4th instar.

(The first instar) Pale yellow. Eyes red. Antennae pale yellowish, with the 4th joint very slightly dusky. Legs pale yellowish. Cornicles, cauda and hairs pale yellowish. Body almost twice as long as wide. Head large, with a pair of bristles on the front that are scarcely or not at all capitate; 2 pairs of long capitate hairs between the antennae and 4 similar hairs arranged in a transverse row in front of the eyes. These capitate hairs almost as long as the 1st antennal joint and each arising from a very small tubercle. Frontal tubercles lacking. Eyes not protuberant, without ocular tubercles. Antennae 4-jointed, more slender than the tibia, about half as long as the body; the basal two joints each provided with a very short capitate hair; the 3rd longer than the basal two joints taken together, almost without hairs; the 4th with a few short setae at the tip; the relative length of joints about as follows: III-24, IV-22 (11+11). Rostrum stout, reaching the middle coxae. Pronotum provided with a pair of long capitate hairs at the middle, each arising from a very small tubercle and 4 similar hairs arranged in a transverse row. Meso-and metathoraces and the first four abdominal segments each with 4 similar capitate hairs arranged in a transverse row on the dorsum. The 5th, 6th, 7th, and 8th abdominal segments each with a pair of capitate hairs on the dorsum; the 9th with a pair of non-capitate bristles on the lower side. The hairs on the body subequal in length. Cornicles somewhat protruding, much shorter than wide.

Cauda not distinct, quite short, without hairs. Legs stout, tibiae almost as long as the 3rd antennal joint, provided with a few rather long bristles which are not capitate; hind tarsi almost as long as the base of the 4th antennal joint; limpid hairs present between the claws.

Length of body-about 0.45 mm.

The 2nd, 3rd, and 4th nymphal instars are each provided with many capitate hairs on the dorsum, which in number and distribution are equal to the hairs of the 1st instar. In the 1st instar one pair of bristles on the front of the head is scarcely or not capitate, though all other hairs on the dorsum are distinctly capitate. In the 2nd and subsequent instars all the dorsal hairs are capitate.

The ocular tubercles begin to appear at the 3rd instar. In the 4th instar the cornicles are almost as long as wide, scarcely constricted near the middle, with the anal plate not bilobed as in the young nymph; and the tubercles which are present on the dorsum of the adult are wanting in the nymphal stage, as in other Callipterina.

Near Taihoku, the eggs hatch in the first week of March, the adults of the first generation, which are winged, appearing about the 2oth day of this month. The oviparous females were observed as late as the 6th day of December in 1922, near Taihoku.

The eggs are deposited upon the lower sides of twigs, are yellow in colour when newly produced, darkening to black in a day, and are variable in shape as shown in the figures (Pl. III, A, figs. 1-4), measuring about 0.37 mm. in length. The winged viviparous females have the habit, when disturbed, of jumping from the host as in many other Callipterina.

In the oviparous female the head is provided with a pair of slightly or scarcely capitate hairs on the front, 2 pairs of capitate hairs between the antennae and 4 similar hairs arranged in a transverse row, as in the nymph of the 1st instar of the viviparous female.

Shivaphis celti Das.

(Pl. III, A, fig. 5 & Pl. V, A, fig. 1)

Aphididae of Formosa-1, p. 74 (1921) and ibid.-2, p. 131 (1923).

Wingless oviparous female.

Dark yellowish brown; wax-pores dusky. Head yellowish. Eyes dark brown. Antennae pale yellowish, apices of the 3rd, 4th and 5th joints and the 6th blackish. Cornicles brown. Cauda dusky yellow. Fore legs pale brown, with the

apices of tibiae and the tarsi dusky; middle and hind femora dusky, with the bases pale brownish; middle tibiae pale brown, with the apices and the tarsi dusky; hind tibiae dusky yellowish, with the tarsi dusky. Body oblong, slightly covered with a powder, provided with some long hairs. Head with some extensive groups of small wax-pores on the dorsal surface. Antennae with a few hairs; the 4th joint slightly imbricated; the 3rd joint without sensoria; the relative length of joints as follows: III-60, IV-30, V-35, VI-35 (29+6). Rostrum nearly reaching the middle coxae. Pronotum with 6 groups of small wax-pores. Meso-and metanota and each abdominal segment with four groups of very small wax-pores on the dorsum.

Each group of wax-pores with a long bristle arising from the center of it. Cornicles almost as in the viviparous form. Cauda not narrowed at the base. Anal plate not bilobed, rounded. Legs with some bristles; hind tibiae somewhat swollen, somewhat stouter than the fore and middle tibiae, provided with about 30 rather large sensoria, which are irregular in shape, mostly on the basal half; hind tarsi almost as long as the 5th antennal joint.

Length of body-about 1.8 mm. Antenna-about 0.87 mm.

Winged male.

Body narrow. Head provided with groups of wax-pores arranged on the dorsum; these groups of wax-pores almost as large as, or a little larger than, the simple eye, with a long bristle arising from the center of each. Eyes very large, with distinct ocular tubercles. Frontal tubercles very short. Antennae with a few hairs; the 3rd joint provided with about 18 large oval sensoria distributed over the whole length in a single row; the 4th somewhat imbricated, with 5-8 circular sensoria; the 5th with 6 similar sensoria, the apical one large; the 6th with about 3 similar sensoria in a row near the base; the relative length of joints as follows: III-80, IV-43, V-45, VI-37 (32+5). Wax-pores present in groups on the dorsum of the thorax. Abdominal segments with 4 groups of wax-pores on the dorsum. These groups of wax-pores with a long bristle arising from the center of each. Cornicles almost as in the female. Cauda moderately constricted near the base. Anal plate slightly sinuated.

Length of body-about 1.3 mm. Antenna-about 1.1 mm.

Some oviparous females and a few males were observed on the leaves of an old *Celtis*, in December, 1922, and in January, 1923, when some viviparous females were also observed on the same host.

Nymph of viviparous female.

Key to instars.

(1) Antennae 5-jointed.....(2)
—— Antennae 6-jointed.....(3)
(2) The 3rd antennal joint almost as long as the 5th.....The 1st instar.
—— The 3rd antennal joint longer than the 5th.....The 2nd instar.
(3) Wing-pads not well developed or body much smaller than that of the adult.....The 3rd instar.
—— Wing-pads well developed or body a little smaller than that of the adult.....The 4th instar.

(The first instar) Pale greenish yellow. Eyes red. Antennae pale greenish, dusky on the apices of the 3rd and 4th joints and the distal half of the 5th. Legs pale greenish, slightly dusky on the tarsi. Body oblong, broadest near the middle of the abdomen, very slightly more than twice as long as wide. Head rather large, on the dorsal surface provided with 6 groups of very small wax-pores arranged in pairs; these groups protuberant, with a rather long bristle arising from the center of each.

Eyes somewhat protuberant, with the ocular tubercles not distinctly so. Frontal tubercles lacking. Antennae more slender than the tibia, much shorter than the body, 5-jointed; the 1st joint almost as long as the 2nd, with a rather long bristle like the 2nd; the 3rd without sensoria; the 4th and 5th with some very minute spinules; the 4th almost as long as the 1st and 2nd taken together, with a bristle near the middle, the sensorium circular, rather small; the relative length of joints about as follows: III-24, IV-15, V-25 (17+8). Rostrum stout, almost reaching the hind coxae. Meso-and metathoraces and most of the abdominal segments each provided with 4 groups of wax-pores arranged as in the adult in a row on the dorsum; from the center of each of these groups a rather long bristle arises. Cornicles wider than long, similar to those of the adult in shape. Anal plate not bilobed. Cauda almost semicircular when seen from above, without hairs. Legs stout, provided with some long bristles; hind tarsi almost as long as the basal part of the last antennal joint.

Length of body-about 0.65 mm. Antenna-about 0.35 or more mm.

(The 2nd instar) Differs from the 1st instar in the following points:

The relative length of antennal joints about as follows: III-35, IV-18, V-28 (20+8). Body about 0.85 mm. in length.

(The 3rd instar) Differs from the 2nd in the following points:

Antennae 6-jointed; the relative length of joints about as follows: III-25, IV-18, V-21, VI-29 (22+7). Wing-pads beginning to appear in the nymph of winged form. Body about 1.15 mm. in length.

(The 4th instar) Differs from the 3rd in the following characters:

Wing-pads well developed in the winged form. Body about 1.25 mm. in length.

The relative length of antennal joints about as follows: III-35, IV-23, V-26, VI-34 (25+9).

It is remarkable that the 3rd and 4th instars of the wingless form are scarcely distinguishable except by the relative size of the body.

In the 1st instar the first pair of groups of wax-pores on the dorsal surface of the head is rather distinctly protuberant and situated on the front. The 1st instar nymph is not covered with cottony secretions, but the 2nd, 3rd and 4th are densely so provided.

Neophyllaphis podocarpi Takah.

(Pl. III, B, figs. 6-9)

Aphididae of Formosa-1, p. 77 (1921) and ibid.-2, p. 129 (1923).

Nymph of viviparous female.

Key to instars.

(1) Antennae 4-jointed.....The 1st instar.
—— Antennae 5-jointed.....The 2nd instar.
—— Antennae 6-jointad.....(2)
(2) The 3rd antennal joint almost as long as the 6th, or the wing-pads beginning to appear.....The 3rd instar.
—— The 3rd antennal joint longer than the 6th; wing-pads well developed.....The 4th instar.

(The first instar) Pink, somewhat yellowish on the head. Eyes dark red to almost blackish. Antennae almost colourless, very slightly dusky at the apices. Legs almost colourless, very slightly dusky on the tarsi. Cauda pale yellowish. Body oblong, broadest at midlength, a little more than twice as long as wide, somewhat flattened, soft, very slightly covered with a powder, about 2.5 times as long as the antenna. Head large, divided, somewhat protruding on the front between the antennae, provided with a few long bristles on the front. Frontal tubercles lacking. Eyes composed of 3 facets. Antennae very short, 4-jointed, not imbricated; the basal two joints each with a long bristle; the 3rd very slightly more

slender than, but almost as long as, the front tibia, with a bristle near the apex, the sensorium very small, circular; the 4th longer than the basal two joints taken together, provided with minute spinules, and a few bristles at the apex; the relative length of joints about as follows: III-25.....30, IV-20. Rostrum very long, reaching beyond the hind coxae. Head and pronotum fused together. Body without tubercles. Abdomen provided with a few moderate to rather long bristles.

Cornicles not distinct, represented almost by a pore. Cauda almost semicircular when seen from above, very short, much wider than long, broadly rounded, with a pair of bristles. Legs provided with a few very long bristles on the distal part of the tibia, and tarsi; tarsi with minute spinules; hind tarsi almost as long as, or slighty shorter than, the 4th antennal joint. Anal plate not sinuated.

Length of body-about 0.7mm. Antenna-about 0.3 mm.

When newly produced, the rostrum reaches far beyond the cauda.

(The second instar) Differs from the first instar in the following characters:

Antennae very slightly dusky at the apices of joints. Legs slightly dusky. Antennae 5-jointed; the 3rd joint with 2 or 3 bristles; the 4th with a bristle; the relative length of joints about as follows: III-30, IV-17, V-25. In some specimens which are probably the nymphs of the winged form, the 3rd antennal joint is comparatively longer and the relative length of the antennal joints is as follows: III-45, IV-19, V-26. Cornicles slightly protruding. Cauda provided with 2 pairs of bristles?

Length of body-about 1.0 mm. Antenna-about 0.6 mm,

(The third instar) Differs from the second instar in the following characters:

Wingless form: antennae 6-jointed, the relative length of joints about as follows: III-27, IV-14, V-20, VI-27.

Length of body-about 1.4 mm. Antenna-about 0.6 mm.

Winged form: wing-pads beginning to appear, yellow, antennae with the 3rd joint longer, the relative length of joints about as follows: III-40, IV-16, V-24, VI-28.

Length of body-about 1.3 mm. Antenna-about 0.55 mm.

(The fourth instar) Differs from the third instar in the following characters:

Wingless form: the relative length of antennal joints about as follows: III-37, IV-17, V-23, VI-25. In some individuals the rostrum is much shorter, reaching only to the middle coxae.

Length of body-about 1.4 mm. Antenna-about 0.7 mm.

Winged form: Head and pronotum well defined; eyes slightly protuberant, with the ocular tubercles distinct; antennae with the relative length of joints about as follows: III-70, IV-25, V-30, VI-30; wing-pads well developed, pale yellow, slightly dusky.

Length of body-about 1.8 mm. Antenna-about 0.9 mm.

The above descriptions were made from specimens collected on March 15 and 17, 1923, at Taihoku.

The noteworthy points in the nymphal stage of this species are as follows:

Head and pronotum fused together except in the full-grown nymph of the winged form.

Eyes composed of 3 facets, but in the full-grown nymph of the winged form true compound eyes begin to appear.

Rostrum variable in length.

The 3rd antennal joint of the winged form (the 3rd and 4th instars) is longer compared with that of the wingless form.

Head divided, though not so in the adult.

Many viviparous females were observed on *Podocarpus* on November 22, 1923, at Kankau, Koshun, Formosa.

Lachnus thujafoliae Theob.

Lachniella thujafoliae, Theobald, Bull. Entom. Research, IV, p. 335 (1914).

Lachnus thujafoliae, Takahashi, Aphididae of Formosa, part 1, p. 81 (1921) and part 2, p. 135 (1923).

Syn. *Lachnus biotae*, van der Goot, Contrib. Fauna Indes. Neerland., 1, 3, p. 161 (1917).

Nymph.

The winged form shows four nymphal instars, but the wingless seems to have three instars.

Key to instars.

Wingless form.

(1) Antennae 4-jointed; cornicles situated on cones which are destitute of hairs.....The 1st instar.

—— Antennae 5 or 6-jointed; cornicles situated on hairy cones.....(2)

(2) Antennae 5-jointed.....The 2nd instar.

—— Antennae 6-jointed.....The 3rd instar.

Winged form.

(1) Antennae 4-jointed; cornicles situated on cones which lack hairs .....The 1ts instar.
—— Antennae 5 or 6-jointed; cornicles situated on hairy cones.....(2)
(2) Antennae 5-jointed.....The 2nd instar.
—— Antennae 6-jointed.....(3)
(3) Wing-pads not well developed.....The 3rd instar.
—— Wing-pads well developed.....The 4th instar.

(The first instar) Body provided with many long hairs. Head divided, though not distinctly so. Frontal tubercles lacking. Eyes scarcely protuberant, with no ocular tubercles. Antennae 4-jointed, hairy, not imbricated; the 3rd joint with an apical sensorium which is very small, circular and not surrounded by hairs as in the adult; the 4th almost as long as the basal two joints taken together; the relative length of joints about as follows: III-50, IV-26. Rostrum reaching far beyond the hind coxae. Cornicles situated on very short cones which are without hairs. Legs furnished with many very long hairs; tibiae stouter than the antenna; tarsi not imbricated, the 2nd joint almost 3.5 times as long as the 1st; hind tarsi a little shorter than the 3rd antennal joint. Cauda very short, hairy, broadly rounded.

Length of body-about 1.2 mm.

(The second instar) Differs from the 1st in the following characters: (1) Body larger. (2) Eyes larger, with the ocular tubercles beginning to be visible. (3) Antennae 5-jointed; sensorium on the 4th joint larger; the relative length of joints about as follows: III-45, IV-20, V-30. (4) Hind tarsi almost as long as the 3rd antennal joint. (5) Cornicles situated on hairy cones.

(The third instar) Antennae 6-jointed; the relative length of joints about as follows: III-45, IV-20, V-25, VI-30. Wing-pads beginning to appear.

(The fourth instar) Antennae 6-jointed; the relative length of joints about as follows: III-65, IV-26, V-32, VI-34. Wing-pads well developed.

The meso-and metathoraces of the second instar of the winged form are very slightly protruding on each side.

Many wingless viviparous females and some nymphs of the winged form were observed on Octover 10, 1923, at Taihoku.

The cornicles of the first instar of *Dilachnus* and *Pterochlorus* are situated on short cones which are almost destitute of hairs, as in this species, but those of the second and the following instars are on hairy cones as in the adult.

The 5th antennal joint of the 3rd and 4th instars of *Lachnus thujafoliae* Theob. is usually provided with a small sensorium in addition to the apical primary one.

Dilachnus formosanus n. sp.

Dilachnus sp., Takahashi, Aphididae of Formosa-2, p. 46 (1923).

Wingless viviparous female.

Differs from *Dilachnus piniformosanus* Takah. in the following characters:

Body larger, measuring about 4 or more mm. in length. More yellowish brown in general colour. Nymphs with a somewhat greenish tinge. Antennae provided with shorter hairs which are fewer in number; the 3rd joint longer than the 4th and 5th taken together; the 5th almost as long as the 4th, with a sensorium near the usual apical one; the relative length of joints about as follows: III-132, IV-52, V-50, VI-45. Hairs on the legs shorter. The 2nd tarsal joint relatively shorter.

Winged viviparous female.

Very closely resembles *D. piniformosanus* Takah., differing from it, however, in the following characters:

Body more yellowish brown in general colour. Hairs on the antenna shorter and fewer in number; the 3rd antennal joint longer than the 4th and 5th taken together; the 4th and 5th equal in length; the relative length of joints about as follows: III-140, IV-57, V-57, VI-48. Legs with shorter setae; tarsi stouter.

Length of body-about 3.7 mm. Antenna-1.6 mm.

Fore wing-about 4.0 mm.

In *D. piniformosanus* Takah., the 3rd antennal joing is almost as long as the 4th and 5th taken together and the 5th is longer than the 4th.

Nymph.

Key to instars.

(1) Antennae 4-jointed.....The 1st instar.
—— Antennae 5-jointed.....The 2nd instar.
—— Antennae 6-jointed.....(2)
(2) Body much smaller than the adult. Wing-pads not well developed.....The 3rd instar.
—— Body only slightly smaller than the adult. Wing-pads well developed.....The 4th instar.

(The first instar) Antennae 4-jointed; the relative length of joints about as

follows: III-90,IV-40. Head without frontal tubercles. Eyes without ocular tubercles. Rostrum reaching far beyond the hind coxae. Cornicles provided with a few long bristles near the base of the cone.

(The second instar) Antennae 5-jointed; the relative length of joints about as follows: III-80, IV-32, V-40. Cornicles on hairy cones.

(The third instar) Antennae 6-jointed; the 5th joint with a sensorium near the usual apical one; the relative length of joints about as follows: III-70, IV-37, V-39, VI-37. Ocular tubercles visible. Wing-pads very short.

(The fourth instar) Antennae 6-jointed; the 5th joint with a sensorium near the usual one; the relative length of joints in the wingless form about as follows: III-98, IV-43, V-40, VI-37. Wing-pads well developed.

Host.-*Pinus sp.*, attacking the shoot.

Distribution.-Formosa: Taihoku, Shinten.

A few viviparous females, both winged and wingless, and nymphs were collected by the author on October 13, 1923, at Taihoku.

Unilachnus orientalis n. sp.

Wingless viviparous female.

Yellowish brown. Head slightly dusky. Eyes black. Antennae pale gray, with the apex of the 5th joint and the 6th black. Cornicles and cauda yellowish brown. Femora dusky brown, paler at the base; tibiae pale greenish gray, with black apices; tarsi black. Body not elongate, provided with many very long hairs, rather densely covered with a powder. Head divided, with many very long hairs. Eyes with the ocular tubercles quite small or almost lacking. Antennae provided with many very long hairs; the 3rd and 4th joints without sensoria; the 5th with a medium-sized sensorium at the apex; the relative length of joints about as follows: III-65, IV-32, V-30, VI-31. Rostrum as in *Unilachnus parvus* Wilson in structure, reaching beyond the middle coxae.

Cornicles on the cones which are rather small and provided with about 17 long hairs. Cauda very short, rounded. Legs very long and stout, covered with powder, furnished with many very long hairs; tibiae stouter than the antenna; tarsi not imbricated; hind tarsi a little shorter than the 3rd antennal joint, the 2nd tarsal joint about twice as long as the 1st.

Length of body-about 2.1 mm. Antenna-about 1.0 mm.

Winged viviparous female.

Yellowish brown. Head somewhat dusky. Eyes black. Antennae pale

yellowish brown, apex of the 5th joint and the 6th black. Mesothorax dusky. Stigma and veins pale brownish gray. Cornicles and cauda yellowish brown. Femora brownish, paler at the base; tibiae pale greenish gray, with black apices; tarsi black. Body not elongate, provided with many very long hairs. Head divided. Eyes protuberant, with the ocular tubercles quite small or almost lacking. Antennae furnished with many very long hairs which are almost as long as those on the head; the 1st joint slightly shorter than these hairs; the 3rd furnished with about 6 medium-sized or rather small circular sensoria arranged in a single row along the whole length except on the basal portion; the 4th without sensoria; the 5th with a primary sensorium of medium size at the apex; the relative length of joints about as follows: III-65, IV-32, V-30, VI-30. Rostrum as in *Unilachnus parvus*, reaching the middle coxae. Wings imbricated; stigma almost as in *U. parvus;* the 3rd oblique faint, obsolete on the basal part, not branched; stigmatic vein very slightly curved; hooklets 4. Cornicles situated on the cones which are not large, provided with about 17 hairs.

Length of body-about 2.2 mm. Antenna-about 1.0 mm.

Fore wing-about 2.75 mm.

Host.-*Pinus sp.*, attacking the leaf.

Distribution-Formosa: Taihoku.

This species differs from *Unilachnus parvus* Wilson (Trans. American Ent. Soc., XLI, p. 104) in the not elongate body, as well as in lacking sensoria on the 4th antennal joint of the winged form.

This aphis resembles *Schizolachnus tomentosus* De Geer in some characters, differing from it, however, in having the 3rd oblique of the front wing unbranched.

A few wingless viviparous females and a winged one were collected by the author on November 3, 1923, at Taihoku.

Eulachnus piniformosanus Takah.

Aphididae of Formosa, part 1, p. 83 (1921) and ibid. part 2, p. 138 (1923).

Nymph.

Key to instars.

(1)	Antennae 4-jointed.	The 1st instar.
——	Antennae 5-jointed.	The 2nd instar.
——	Antennae 6-jointed.	(2)
(2)	The 4th antennal joint without sensoria.	The 3rd instar.
——	The 4th antennal joint with a sensorium.	The 4th instar.

(The first instar) Body narrow, with many long bristles. Head divided, though not distinctly so, with about 15 bristles on the dorsal surface. Eyes rather large, distinctly protuberant. Antennae 4-jointed; the relative length of joints about as follows: III-47, IV-28. Rostrum usually reaching far beyond the hind coxae, but sometimes reaching only to the middle or hind coxae. Cornicles as in the adult in shape. Cauda almost semicircular when seen from above.

(The second instar) Antennae 5-jointed; the relative length of joints about as follows: III-40, IV-20, V-28.

(The third instar) Antennae 6-jointed; the ralative length of joints about as follows: III-37, IV-17, V-25, VI-30. Wing-pads beginning to appear.

(The fourth instar) The 4th antennal joint of either the winged or wingless form provided with a sensorium near the apex; the relative length of joints about as follows: III-47, IV-20, V-29, VI-35. Wing-pads well developed.

The hairs on the head are variable in number. Each half of the dorsal surface of the head is provided with from 8 to 11 hairs in the wingless adult and with about 10 in the winged form. The wingless adult is furnished with a sensorium at the apex of the 4th antennal joint and sometimes with one at the apex of the 3rd also.

Host.-*Pinus sp,* attacking the leaf.

Distribution.-Formosa: Taihoku, Kagi, Koshun.

Japan: Kyoto, Oita prefecture, Tokyo.

This species is probably a synonym of *E. thunbergii* Wilson (Entom. News, XXX, 1, p. 3, 1919).

Aiceona osugii n. sp.

(Pl. X, A, figs. 9-11 & Pl. X, B. fig. 1)

Wingless viviparous female.

Yellowish green. Antennae and legs yellowish green. Eyes black?

Body elongate oval, furnished with many very long fine hairs. Head not fused with the prothorax, almost twice as broad as long, not divided by a median line on the dorsal surface. Frontal tubercles lacking. Eyes rudimentary, sometimes composed of a few facets, with the ocular tubercles distinctly protuberant, but usually only the ocular tubercles are apparent. Antennae long, very slightly imbricated, 6-jointed, provided with many very long hairs; the 1st joint about as long as, but stouter than, the 2nd; the 3rd and 4th without sensoria; the 5th with the apical sensorium large, circular, protuberant and not surrounded by a row of setae; the relative length of joints about as follows: III-125, IV-58, V-56, VI-57(35+22). Rostrum

reaching the middle coxae. Abdomen without tubercles. Cornicles small, very short, situated on very shallow cones which are provided with some very long hairs. Cauda very short, rounded, with some very long hairs. Legs very long, with many very long hairs; hind tibiae stouter than the 3rd antennal joint; hind tarsi scarcely imbricated, about twice as long as the distal part of the last antennal joint.

Body-about 2.5 mm. Antenna-about 1.6 mm.

Winged viviparous female.

Head, eyes, antennae and thorax black. Abdomen brownish, each segment on the dorsum with a large black marking at the middle and some additional very small black patches. Wings dusky in two specimens the author has examined, with the stigma blackish. Legs black. Body elongate, with many very long hairs. Head much wider than long, not divided on the dorsal surface. Eyes with distinct ocular tubercles. Frontal tubercles lacking. Antennae somewhat imbricated, furnished with many very long fine hairs; the 3rd joint provided with about 58 large to medium-sized, protuberant, circular or oval sensoria scattered over the whole length; the 4th with about 25 similar sensoria; the 5th with from 5-12, the primary sensorium large, circular; the 6th with about 2 small sensoria on the basal part; the relative length of joints about as follows: III-130, IV-65, V-62, VI-58 (38+20). Rostrum reaching the middle coxae.

Subcosta of the front wing furnished with some (about 25) very long hairs arranged in a single row along the whole longth; the 1st oblique nearly straight; the 2nd slightly curved; the 3rd twice forked, the upper branch extending to slightly above the tip of the wing; stigma short and stout; stigmatie vein moderately curved; hind wings with 2 divergent obliques; hooklets 4. Abdomen without tubercles. Cornicles and cauda as in the wingless form. Legs very long and slender, furnished with many very long fine hairs; tibiae more slender than the 3rd antennal joint; hind tarsi slightly imbricated, about twice as long as the distal part of the last antennal joint.

Length of body-about 3.0 mm. Antenna-about 1.7 mm.

Fore wing-about 4.0 mm.

Host.-A tree the name of which has not been determined, attacking the lower side of the young leaf.

Distribution.-Formosa.

Some wingless viviparous females and two winged ones were collected on December 2,1923. This aphis, the second species of the genus, differs from *A.*

actinodaphnii Takah. (Aphididae of Formosa-1, p. 85) in the following characters: (1) Body elongate. (2) Wingless females yellowish green. Winged ones brownish, with black markings on the dorsum. (3) Eyes of the wingless form more rudimentary. (4)Antennae of the winged form provided with more sensoria. (5) Cornicles smaller, situated on very shallow cones.

Genus **Oregma**

Key to Formosan species

(1) Green. Horns on the head always rounded at the tip. The 8th abdominal segment with 2 rows of wax-pores.....(2)
—— Usually brownish or blackish. Horns usually sharply pointed at the apex. The 8th abdominal segment when provided with wax-pores with a group of them on the dorsum.....(3)
(2) Middle area of the dorsum of body dark green.....*O. formosana* n. sp.
—— Body on the dorsum with a pair of longitudinal dark green patches which are usually interrupted at midlength.....*O. bambusifoliae* Takah.
(3) Body not depressed, without well-developed wax-pores.....*O. bambusicola* Takah.
—— Body rather depressed or not so, provided with well-developed wax-pores.....(4)
(4) Body not depressed, without well-developed wax-pores on the head, thorax and basal abdominal segments, but provided with them on the 6th, 7th and 8th abdominal segments.....*O. alexanderi* n. sp.
—— Body depressed or not so, provided with well-developed wax-pores on the thorax and basal abdominal segments.....(5)
(5) Thorax and basal abdominal segments furnished with latral as well as dorsal wax-pores.....(6)
—— Thorax and basal abdominal segments furnished only with lateral wax-pores.....(8)
(6) Horns on the head rounded at the tip.....*O. panicola* Takah.
—— Horns sharply pointed.....(7)
(7) Body rather depressed, with the well-developed wax-pores larger in diameter than the apex of the cornicle.....*O. pseudomontana* n. sp.
—— Body not depressed, with the well-developed wax-pores as large in diameter or smaller than the apex of the cornicle.....*O. koshunensis* n. sp.
(8) Yellowish or dark greenish.....*O. lanigera* Zehnt.
—— Brownish black.....(9)
(9) Horns on the head almost as long as the 1st antennal joint.....*O. orientalis* Takah.
—— Horns almost as long as the 4th antennal joint.....*O. oplismeni* n. sp.

Oregma panicola Takah.

Aphididae of Formosa-1, p. 90 (1921); Aphididae of Formosa-2, pp. 49 and 144 (1923).

Full-grown nymph of winged viviparous female.

Head and prothorax fused together, provided with numerous very small wax-pores, which are rather irregular in shape like those of *Oregma bambusicola* Takah., scattered over the whole surface of the dorsum. Head furnished with a few hairs which are almost as long as the horn. Horns rather stout, but much more slender than the antenna, a little shorter than the first antennal joint, the tips rounded. Antennae stout, more so than the tibiae, 5-jointed, provided with a few long bristles; the 4th joint shorter than the basal two joints taken together, with a very small apical sensorium which is somewhat protuberant, the 5th not imbricated; the relative length of joints as follows: III-32, IV-14, V-25. Eyes not protruding, with the ocular tubercles(3 facets)somewhat protuberant. Rostrum stout, not reaching the middle coxae. Dorsal and lateral tubercles absent. Wing-pads wide. Abdomen without wax-pores but with a few bristles. Cornicles very short, much wider than long, expanded toward the base. Cauda very short and wide. Anal plate not bilobed. Hind femora almost as long as the antenna, provided with some moderately long bristles; tibiae furnished with some very long bristles; hind tarsi scarcely imbricated, almost as long as the 3rd antennal joint, with a few very long bristles.

Length of body-about 1.7 mm. Antenna-about 0.5 mm.

Nymph of wingless female provided with many circular wax-pores distributed as in the wingless adult.

Numerous viviparous females, both winged and wingless, were observed on *Panicum patens* on December 3, 1922, at Urai, Formosa. Many wingless females were collected on the host on November 22, 1923, at Kankau, Koshun, Formosa.

Oregma bambusicola Takah.

Aphididae of Formosa-1, p. 89 (1921) and ibid.-2, pp. 50 and 142 (1923).

Nymph of viviparous female.

(The first instar Dark brownish purple. Horns yellowish brown. Eyes black. Antennae yellowish brown, with the apical parts blackish. Legs yellowish brown.

Body narrow, flat, only slightly dusted with powder. Wax-pores very small, rather irregular in shape, numerous, scattered over the whole surface of the dorsum. Head fused with the prothorax, without long hairs on the dorsal surface, but with some long bristles on the lower surface.

Eyes of 3 facets. Horns very long and slender, almost as long as the 3rd antennal joint, rather sharply pointed, curved upwards, somewhat expanded toward the base, without hairs. Antennae stouter than the horns, 4-jointed; the 1st joint larger than the 2nd; the 3rd not imbricated, with some long bristles, the sensorium of medium size and protuberant; the 4th imbricated, with a few long bristles, almost as long as the basal two joints taken together; the relative length of joints as follows: III-37, IV-31. Rostrum very stout, almost reaching the hind coxae. Abdomen provided with a few bristles on the dorsum and some very short setae on the lower side of the segment. Cornicles not visible.

Cauda short, broadly rounded, not constricted. Anal plate not bilobed. Legs very large, long and stout; tibiae provided with many very long hairs; tarsi long, not imbricated; hind tarsi a little longer than the 3rd antennal joint, as stout as the antenna, provided with a few very long hairs.

Length of body-about 1.2 mm. Antenna-about 0.24 mm.

Hind leg-about 1.85 mm.

(Full-grown nymph of winged viviparous female). Head yellowish green. Eyes black. Antennae blackish brown. Prothorax dark yellowish brown. Mesothorax brown, somewhat greenish. Wing-pads black. Abdomen brownish black. Cauda yellowish brown. Legs yellowish brown, apices of tibiae, and tarsi black. Body stout. Wax-pores very small, rather irregular in shape, numerous, scattered over the whole surface of the dorsum as in the young nymph and the wingless viviparous female. Head fused with the prothorax, almost without hairs on the dorsum, but with some bristles on the ventral surface. Horns almost as long as the 1st antennal joint, moderately expanded toward the base, rather sharply pointed, with a few very small hairs. Eyes large, not protuberant; ocular tubercles distinct. Antennae very stout, more slender than the femur, but slightly stouter than the tibia, somewhat curved, with a few long bristles, 5-jointed; the 1st joint larger than the 2nd; the 4th with an apical sensorium of medium size; the relative length of joints as follows: III-55, IV-40, V-30. Rostrum almost reaching the middle coxae. Body without tubercles. Wing-pads not long, wide.

Abdomen provided with a few bristles. Cornicles very short, much wider than long, scarcely on cones.

Cauda wider than long, broadly rounded, not constricted. Anal plate not bilobed. Legs long, furnished with many very long hairs; tarsi long; hind tarsi almost as long as the 4th antennal joint.

Length of body-about 2.7 mm. Antenna-about 0.7 mm.

Some winged viviparous females were observed on January 14, 1924, at Taihoku.

Oregma alexanderi n. sp.

(Pl. X, B, figs. 4-5 & 12)

Wingless viviparous female.

Almost brownish black, with a somewhat purplish tinge, slightly covered with powder. Antennae brownish, with the last joint black. Tibiae brownish. In specimens treated with caustic potash, the head and prothorax dark brownish, meso-and metathorax each with a very large dark brownish patch on the sides together with some very small spots, basal three abdominal segments each with a large similar patch on the sides, the 4th and the following abdominal segments each with a smaller similar patch on the sides, legs yellowish brownish, cornicles almost black, cauda and anal plate dusky. Body somewhat elongate oval, not depressed. Head fused with the prothorax, with some rather long hairs. Eyes composed of 3 facets. Horns rather stout, almost as long as the 1st antennal joint, sharply pointed at the apex, curved upward. Antennae rather slender, 4-jointed, with a few moderate or rather long hairs; the 1st joint larger than the 2nd; the 3rd very slightly curved, slightly expanded at the apex, sometimes with a constriction, the sensorium very small; the 4th almost as long as or slightly shorter than the basal two joints taken together; the relative length of joints about as follows: III-57, IV-33. Rostrum very stout, reaching the hind margin of the prothorax. Thorax and abdomen furnished with some rather long bristles. Cornicles not situated on cones, very short, but very large in diameter, much larger than the wax-pore on the 8th abdominal segment. Cauda much wider than long, wider than the opening of the cornicle and the lobe of the anal plate, constricted at the base, with some very long bristles.

Anal plate large, deeply bilobed, with some very long bristles. Legs very long; tibiae much stouter than the antenna, front tibiae about twice as long as the antenna; hind tibiae provided with many rather long bristles; tarsi long, not imbricated, hind tarsi longer than the 3rd antennal joint. The 6th abdominal

segment furnished with from 1-4 well-developed circular wax-pores arranged in a group on the dark brownish patch on the sides, the 7th with from 4-6 larger ones on the sides, the 8th with about 9 or 10 very large circular or subcircular wax-pores in a group at the middle of the dorsum. Head, thorax and basal abdominal segments without well-developed wax-pores. Numerous very small, poorly developed wax-pores are recognizable, these subcircular or irregular in shape, not transparent, and scattered over the dark brownish patches on the dorsum. These poorly developed wax-pores are also visible in *O. bambusicola* Takah. The wax-pores scattered over the dorsum of *Aleurodaphis* differ from those of these species of *Oregma* in the larger size, circular shape and in being transparent.

Length of body-about 4.0 mm. Antenna-about 0.65 mm.

Hind tibia-about 1.75 mm.

Host.-*Dendrocalamus latiflorus*, attacking the young shoot.

Distribution.-Formosa.

The wingless viviparous females were observed in great abundance on December 2,1923. This aphis is named in honour of Prof. Dr. C. P. Alexander of the Massachusetts Agricultural College, United States of America, to whom the author acknowledges indebtness for many favours. This new species is very closely related to *Oregma bambusicola* Takah., differing from it, however, in the following characters:

(1) Body more elongate. (2) Rostrum shorter, not reaching the middle coxae. (3) Legs much longer. (4) Cornicles larger in diameter. (5) The 6th, 7th and 8th abdominal segments provided with well-developed wax-pores. (6) Body with more dark brownish patches, which become apparent in specimens treated with caustic potash.

Oregma pseudomontana n. sp.

(Pl. VI, B, figs. 14 & Pl. VII, A, fig. 1)

Oregma montana, Takahashi, Aphididae of Formosa-2, p. 52 (1923).

Wingless viviparous female.

Dark purplish, very slightly dusted with powder. Body broad, rather depressed. Head fused wish the prothorax, provided with some rather long hairs. Horns almost as long as the 1st antennal joint, rather pointed at the apex, broadest at the base, tapering, about twice as long as wide at midlength. Eyes composed of 3 facets. Antennae very short, 4-jointed, provided with a few rather long hairs; the 3rd joint somewhat expanded towards the apex, with the apical sensorium very

small and circular as in most species of *Oregma;* the 4th very slightly imbricated, almost as long as the basal two joints taken together; the relative length of joints about as follows: III-20. IV-19.....20. Rostrum very stout, almost reaching the middle coxae. Abdomen provided with a few rather long bristles on the dorsum. Cornicles very short, somewhat protruding. Cauda much wider than long, wider than the lobe of the anal plate, constricted at the base, with some very long bristles. Anal plate bilobed, each lobe being provided with about 5 very long bristles. Tibiae rather long, stouter than the antenna, furnished with some long bristles; tarsi scarcely imbricated, hind tarsi longer than the 3rd antennal joint. Wax-pores well-developed, very large, larger than the opening of the cornicle in diameter, circular, subcircular or oval, distributed as follows:

(a) On the side of the body: head-0, prothorax-4.....7 in each group, mesothorax-5.....6, metathorax-5.....7, the 1st abdominal segment-4, the 2nd, 3rd, 4th and 5th each-5.....6, the 6th-6.....8, the 7th-7.....8.

(b) On the dorsum: head-5.....9 in each group, prothorax-3.....6, mesothorax-6.....8, metathorax-3.....5, the 1st abdominal segment-1.....3, the 2nd-1.....3, the 3rd-0.....3, the 4th-1.....2, the 5th-2, the 6th and 7th-0; the 8th-about 10-12 in a group at the middle. Wax-pores on the head somewhat smaller than those on the remaider of the body.

Length of body-about 1.5 mm.

Winged viviparous female.

Head, eyes, antennae, thorax and legs black. Abdomen dark purplish. Head provided with many very short hairs on the dorsal as well as on the ventral surface. Horns almost entirely lacking. Eyes very large, with the ocular tubercles small. Antennae striate, 5-jointed, without hairs; sensoria annular, almost entirely encircling the segment, distributed as follows: III-22.....24, IV-10.....12, V-8.....9; the relative length of joints about as follows: III-75, IV-35, V-35. Rostrum stout, not reaching the middle coxae. The 1st and 2nd obliques on the front wing united at their bases; the 3rd once-forked, obsolete at the base; subcosta provided with about 7 small sensoria; hind wings with 2 obliques that are not parallel; hooklets 2. Abdomen furnished with some rather long bristles. Legs slender; tibiae more slender than the antenna, provided with many moderate or rather long bristles; tarsi slightly imbricated, hind tarsi shorter than the 4th antennal joint.

Length of body-about 1.3 mm. Antenna-about 0.7 mm.

Fore wing-about 2.7 mm.

Host.-*Bambusa nana*, *Bambusa stenostachya*, *Bambusa*, *species*, attacking the lower side, especially the basal part, of the leaf.

Distribution.-Formosa: Taihoku, Shirin, Hori.

The nymphs of the wingless form are provided with well-developed wax-pores distributed as in the adults, with the anal plate not bilobed and the cauda not constricted as in the adults of *Ceratoglyphina*. The young nymphs have very long, slender, sharply pointed horns on the head as in *O. bambusicola* Takah. This new *Oregma* closely resembles *O. montane* v. d. Goot, but differs from it in the following characters:

(1) Wingless form never yellowish in the nymphal or adult stage.

(2) Wingless form provided with wax-pores on the head.

(3) The 3rd antennal joint of the wingless form almost as long as the 4th.

(4) Winged adult with the horns on the head almost lacking.

Since the publication of the results of my observations on the species (Aphididae of Formosa-2, p. 144), some wingless and a winged viviparous females have been collected in October and November near Taihoku.

Oregma koshunensis n. sp.

(Pl. X, B, fig. 8)

Wingless viviparous female.

Almost black, slightly covered with powder and with a slight purplish tinge. Antennae and legs almost yellowish brown. Body oval, not depressed. Head fused with the prothorax, with some rather long hairs. Eyes composed of 3 facets. Horns stout, broadest at the base, tapering, with the apex sharply pointed, curved upward, longer than the 1st antennal joint, somewhat shorter than the 4th antennal joint. Antennae very short, rather stout, 4-jointed, with a few long hairs; the 1st joint much stouter than the 2nd; the 3rd narrowed on the basal portion, with the apical sensorium very small; the 4th almost as long as the 1st and 2nd taken together; the relative length of joints about as follows: III-28, IV-20. Rostrum very stout, nearly reaching the middle coxae. Abdomen with some rather long hairs on the dorsum. Cornicles not large, somewhat protuberant, not situated on hairy cones, with the apex as large as or a little larger in diameter than the wax-pore on the dorsum of the abdomen. Cauda much wider than long, the cornicle and the lobe of the anal plate, constricted at the base, with some very long bristles. Anal plate deeply bilobed, with some very long bristles. Legs rather stout; tibiae much stouter

than the antenna, with some long hairs, front tibiae almost as long as, or slightly longer than, the antenna; tarsi not imbricated a little longer than the 3rd antennal joint. Well-developed wax-pores that are not very large, circular or subcircular in shape, distributed as in *Oregma montana* v. d. Goot, the number in each group about as follows:

(a) Dorsal wax-pores: head-0, prothorax-3……10, mesothorax-9……11, metathorax-3……5, the 1st abdominal segment-1……3, the 2nd and 3rd-2……4, the 4th-1 ……5, the 5th-0……2, the 6th-0……1, the 7th-0; the 8th-3……7 in a group at the middle.

(b) Lateral wax-pores: head-0, prothorax-0……2, mesothorax-0……2, metathorax-0……3, the 1st abdominal segment-1……3, the 2nd-2……6, the 3rd-2……6, the 4th-4……8, the 5th-2……7, the 6th-4……9, the 7th-2……4.

In specimens treated with caustic potash, the head appears brownish and many brownish patches are visible on the dorsum of the body, while numerous very small poorly-developed wax-pores which are rather irregular in shape, are scrttered over the dorsum as in *Oregma bambusicola* Takah.

Length of body-about 1.84 mm.

Host.-*Bambusa sp.*, attacking the shoot.

Distribution.-Formosa: Kusukusu, Koshun.

Many viviparous females grouping densely on the shoots were observed on November 24, 1923, at Kusukusu, when no winged forms were discovered. This aphis differs from the original description of *Oregma montana* v. d. Goot in the following characters: (1) Never yellowish. (2) Horns on the head longer. (3) Abdomen provided with some hairs.

This new *Oregma* is also very closely allied to *O. pseudomontana* n. sp., differing from it, however, in the following characters: (1) Body not depressed. (2) Horns on the head larger. (3) Head without well-developed wax-pores. (4) Wax-pores on the body smaller. (5) Wax-pores on the thorax much smaller than those on the dorsum of the abdomen. In *O. pseudomontana* n. sp., these are equal in size. (6) Wax-pores on the 8th abdominal segment usually fewer in number. (7) Legs stouter.

Oregma bambusifoliae Takah.

(Pl. VIII, A, figs. 2-8)

Aphididae of Formosa-1, p. 87 (1921) and Aphididae of Formosa-2, p. 143 (1923).

Nymph of viviparous female.

The winged viviparous female, like most Aphididae, shows four nymphal instars, but in the nymph of the wingless form only three instars are to be distinguished,

(Winged form)

Key to instars.

(1) Antennae 4-jointed.....(2)
—— Antennae 5-jointed.....(3)
(2) The 3rd antennal joint as long as the 4th; horns on the head somewhat pointed at the apex; cornicles absent.....The 1st instar.
—— The 3rd antennal joint a little longer than the 4th; horns rather rounded at the apex; cornicles present.....The 2nd instar.
(3) The 3rd antennal joint almost as long as the 5th; wing-pads not well-developed.....The 3rd instar.
—— The 3rd antennal joint longer than the 5th; wing-pads well-developed.....The 4th instar.

(The first instar) Yellowish green, with a pair of indistinct longitudinal greenish patches on the dorsum. Antennae almost colourless or pale greenish, with the last joint slightly dusky. Eyes almost dusky. Legs pale greenish, slightly dusky on the apices. Body wide, rather flat, only slightly dusted with powder. Wax-pores well-developed as in the wingless adult, rather large, somewhat transversely narrowed, distributed as in *Oregma insularis* v. d. Goot. Head fused with the prothorax, provided with 2 or 3 wax-pores near the eye, and with a few very long bristles which are shorter than the horns on the head. Horns large, with the apex somewhat sharply pointed, gradually expanded toward the base, somewhat curved upwards, almost as long as the basal two antennal joints taken together. Eyes composed of 3 facets.

Antennae short, almost as stout as the horn at the base, slightly more slender than the tibia, 4-jointed, provided with a few long bristles; the 3rd joint with a small circular sensorium at the apex; the 4th somewhat imbricated, longer than the basal two joints taken together; the relative length of joints about as follows: I+II-15, III-21, IV-21. Rostrum stout, reaching a little beyond the middle coxae. Thoracic and the basal 8 abdominal segments each provided with a group of wax-pores on the side; each group composed of 4 or 5 wax-pores arranged in a single longitudinal row. Abdomen with a few long bristles. Cornicles not visible.

Cauda not distinct. Anal plate not bilobed. Legs rather large, provided with some long bristles; hind tibiae longer than the antenna; tarsi slightly imbricated, provided with 4 extremely long slightly knobbed hairs; hind tarsi almost as long as the 4th antennal joint.

Length of body-about 0.65 mm.

(The second instar) Differs from the 1st instar in the following points:

(1) The 3rd antennal joint longer than the 4th.
(2) Horns on the head rounded at the apex.
(3) Hind tarsi shorter than the 3rd antennal joint.
(4) Cornicles present, situated on cones which are provided with hairs.

The relative length of antennal joints about as follows: III-30, IV-24.

(The third instar) Differs from the 4th instar in the following characters:

(1) The 3rd antennal joint almost as long as the 5th.
(2) Wing-pads not well developed; meso-and metathoraces somewhat protruding on the sides.
(3) Eyes composed of 3 facets; eyes of the adult not visible.
(4) Body shorter, measuring about 1.5 mm. in length.

The relative length of antennal joints about as follows: III-30, IV-15, V-28.

(The fourth instar) Yellowish green to almost yellow, with a pair of longitudinal green patches on the dorsum, which are interrupted at midlength. Antennae pale greenish. Eyes brownish. Wing-pads pale yellow. Legs pale green. Cornicles and cauda concolourous with the body. Head without wax-pores, fused with the pronotum, the dorsal surface with a few long bristles which are shorter than the horns. Frontal tubercles lacking as in other instars. Eyes not protruding, with the ocular tubercles very small. Horns long, much more slender than the antenna, very slightly expanded toward the base, almost as long as the basal two antennal joints taken together, the apex rounded.

Antennae very stout, stouter than the tibia, 5-jointed, with a few rather long bristles; the 4th joint almost as long as the basal two joints taken together, with the sensorium circular and very small; the 5th slightly imbricated on the apical portion; the relative length of joints about as follows: III-50, IV-25, V-30. Rostrum short, reaching beyond the front coxae. Thorax without wax-pores, mesothorax large, with the wing-pads well-developed. Abdomen with a few long bristles, the 2nd, 3rd, 4th, 5th, 6th, 7th, and 8th segments each provided with 5-7 small wax-pores, which are circular or oval, arranged in a row on either side.

Cornicles on hairy cones, large, of Lachnid-appearance, each cone being provided with from 10-14 long bristles. Cauda very short, not constricted, provided with some bristles. Anal plate not bilobed. Legs slender, tibiae provided with some very long bristles; tarsi not imbricated: hind tarsi almost as long as the 4th antennal joint.

Length of body-about 2.0 mm.

(Wingless form)

Key to instars.

(1) The 3rd antennal joint almost as long as the 4th.....(2)
—— The 3rd antennal joint much longer than the 4th.....The 3rd instar.
(2) Horns on the head rather pointed at the apex.....The 1st instar.
—— Horns rather rounded at the tip.....The 2nd instar.

The 1st instar is like that of the winged form. The 2nd: Body larger, with the horns on the head rather rounded at the tip; the 3rd antennal joint almost as long as, or very slightly longer than, the 4th. The 3rd or full-grown nymph: Body larger; horns longer than those of the 2nd instar, with the apex rounded as in the adult; the 3rd antennal joint much longer than the 4th.

Wingless viviparous female (adult).

Antennae 4 or 5-jointed. Cornicles situated on cones which are provided with about 12 long bristles.

In *Oregma bambusicola* Takah., the horns on the head of the young nymph are much longer than those of the adult of the wingless viviparous female, but in *O. bambusifoliae* Takah., those of the nymph are shorter than those of the wingless adult.

In *O. bambusifoliae* Takah., as in other species of *Oregma*, the horns of the winged adult are much smaller than those of the nymph. These descriptions were made from specimens collected in April and May, 1923, near Taihoku.

The cornicles of *O. bambusicola* Takah., *O. panicola* Tokah., *O. montana* v. d. Goot, *O. lanigera* Zehnt. and *O. orientalis* Takah. are not situated on hairy cones, unlike those of *O. bambusifoliae* Takah. Many wingless viviparous females of *O. bambusifoliae* were observed in November 1923, at Kuraru, Koshun, Heito and Kizan, Formosa.

Oregma formosana n. sp.

(Pl. X, B, figs. 9-10)

Wingless viviparous female

Pale green, with the median area of the dorsum dark green. Body wide, somewhat convex on the dorsum, sparsely dusted with powder. Head fused with the prothorax, provided with a few very long hairs. Eyes composed of 3 facets. Horns long, rounded at the apex, very slightly dilated towards the base, almost as stout as, or slightly stouter than, the 3rd antennal joint, not curved upward, almost as long as the 1st and 2nd antennal joints taken together. Antennae rather slender, 4-jointed, with a few rather long hairs; the 3rd joint with the apical sensorium very small; the 4th a little longer than the 1st and 2nd taken together; the relative length of joints about as follows: III-32, IV-23 (19+4). Rostrum very short, reaching beyond the front coxae. Thorax and abdomen provided with some long hairs. Abdomen wide. Cornicles rather large, situated on the shallow cones which are provided with some long hairs, the diameter much larger than the wax-pore. Cauda rather small, almost as wide as the lobe of the anal plate, slightly constricted at the base.

Anal plate bilobed, with some long bristles. Legs provided with rather sparse long fine hairs; tibiae stouter than the 3rd antennal joint; hind femora almost as long as the antenna; hind tarsi very slightly shorter than the 4th antennal joint. Wax-pores circular, subcircular or oval, not very large, arranged in a row on the side of each segment as in *O. insularis* v. d. Goot; the number in a single row is about as follows: head-3.....5, prothorax -3, meso-and metathorax-3.....4; the 1st abdominal segment-4, the 2nd abd. seg.-5.....6, the 3rd, 4th and 5th abd. segs. each-4.....5, the 6th, 7th and 8th abd. segs. each.-3.....4

Length of body.-about 1.6 mm.

Host.-*Dendrocalamus latiflorus*, attacking the leaf.

Distribution.-Formosa.

A few wingless viviparous females were collected by the author on December 2, 1923. This aphis is very closely related to *O. insularis* v. d. Goot and *O. striata* v. d. Goot, but differs from them in the antennal structure.

Oregma oplismeni n. sp.

(Pl. X, B, figs. 6-7)

Wingless viviparous female.

Blackish purple. Body broad, somewhat depressed, densely dusted with powder, as in *O. lanigera* Zehnt. Head fused with the prothorax, with some very long fine hairs. Eyes composed of 3 facets. Horns large, rather stout, broadest at the base, tapering, with the apex sharply pointed, scarcely curved upward, about twice as

long as wide at the base, almost as long as the 4th antennal joint. Antennae very short, 4-jointed, with a few long hairs; the 3rd joint moderately expanded toward the apex, with the apical sensorium quite small; the 4th almost as long as the basal two joints taken together; the relative length of joints about as follows: III-17, IV-15. Rostrum quite short, reaching beyond the front coxae. Abdomen wide, with some rather long hairs. Cornicles very short. Cauda much wider than long, wider than the lobe of the anal plate, constricted at the base, provided with some long bristles. Anal plate bilobed, with some long bristles. Legs furnished with some moderate or very long fine hairs; tibiae stouter than the antenna; front tibiae a little longer than the antenna; tarsi not imbricated; hind tarsi longer than the 3rd antennal joint. Wax pores well-developed, large, circular or subcircular, distributed as in *O. lanigera* Zahnt. Head between the eyes with two groups of wax-pores, each group containing about 6 pores. Each thoracic and abdominal segment (from the 1st to the 7th) with about 8-10 wax-pores in a circular group on the sides; the 8th abdominal segment with numerous (about 20 ?) wax-pores in a group at the middle of the dorsum.

Length of body-about 1.5 mm.

Host.-*Oplismenus compositus*, attacking the leaf.

Distribution.-Formosa: Kuraru, Koshun,

A few wingless forms were collected by the author on November 19, 1923.

This aphis differs from *O. orientalis* Takah. (Aphididae of Formosa-2, p. 52) in the following characters:

(1) Head provided with wax-pores.

(2) Horns larger.

(3) Antennae shorter, 4-jointed, the 4th joint very slightly shorter than the 3rd.

In *O. orientalis* Takah., the 3rd antennal joint is sometimes divided, though not distinctly so, and the relative length of the 3rd and 4th joints is about 28: 20. *O. oplismeni* is easily distinguishable from *O. lanigera* Zehnt. by the colour of the body, as well as by the stouter horns on the head.

Cerataphis formosanus n. sp.

(Pl. X, B, fig. 3)

Wingless viviparous female.

Black, with white secretions along the whole margin of the body. Head fused with the prothorax, on the lower side with a pair of very small tubercles

between the antennae and with a few rather long fine hairs. Eyes composed of 3 facets. Horns rather stout, nearly finger-like in shape, with the apex rounded, almost united at their bases, about as long as the 2nd antennal joint. Antennae 4-jointed, provided with a few rather long hairs; the 3rd joint sometimes with an indistinct constriction, with the apical sensorium quite small; the 4th about as long as the basal two joints taken together; the relative length of joints about as follows: III-32, IV-29 (18+11). Rostrum very stout, reaching the middle coxae. Thorax and abdomen well defined. Abdomen provided with a few hairs. Cornicles much larger than the wax-pore, slightly protuberant. Cauda wider than long, narrower than the lobe of the anal plate, constricted at the base, furnished with some very long bristles. Anal plate bilobed, with some very long bristles. Tibiae stouter than the 3rd antennal joint, furnished with some moderate to rather long hairs; hind tibiae slightly longer than the antenna; hind tarsi as long as or slightly shorter than the 4th antennal joint. Wax-pores oval, arranged in a single row along the whole margin of the body, about 240 in number.

Length of body-about 2.1 mm. Width of body-about 1.4 mm.

Host.-*Cocos sp.*, attacking the young leaf.

Distribution.-Formosa: Kuraru, Koshun.

Some wingless forms were collected by the author on November 20, 1923.

This aphis differs from *C. lataneae* Boisd. in the following characters:

(1) Body larger, provided with more wax-pores.

(2) Horns on the head almost united at their bases, nearly finger-like in shape, with the apex rounded, almost as long as the 2nd antennal joint.

(3) Rostrum longer, reaching the middle coxae.

Cerataphis lataneae Boisd.

Aphididae of Formosa-1, p. 91 (1921); Aphididae of Formosa-2, pl. IV, B, fig. 1 (1923).

Nymph.

(The first instar). Body not hard, rather flat, almost twice as long as wide. Wax-pores circular, protuberant, arranged in a single row along the whole margin of the body as in the adult of the wingless viviparous female. Head fused with the prothorax, provided with a few short hairs on the dorsal surface and a pair of very long bristles, which are much longer than the horns, between the antennae on the lower side. Horns rather stout, almost as long as the 1st antennal joint, sharply pointed, expanded toward the base. Eyes of 3 facets. Antennae short, 4-jointed,

with a few rather long bristles; the 1st joint larger than the 2nd; the 3rd a little longer than the 1st and 2nd joints taken together, with a very small apical sensorium; the 4th somewhat imbricated; the relative length of joints as follows: III-18, IV-18 (9+9). Rostrum reaching the hind coxae. Body without horns. Meso-and metathoracic segments much larger than the abdominal segment, with 2 bristles on either side. Abdominal segments defined, with a bristle on either side. Cornicles absent? Cauda not distinct. Anal plate not bilobed. Legs rather large; furnished with a few very long bristles; tibiae stouter than the antenna; hind tibiae shorter than the antenna; tarsi provided with a few very long bristles; hind tarsi a little shorter than the 3rd antennal joint.

Length of body-about 0.65 mm.

Astegopteryx styracicola Takah.

(Pl. VI, A, figs. 1-2)

Aphididae of Formosa-1, p. 94 (1921) and ibid.-2, pp. 53 and 146 (1923).

Wingless viviparous female in the gall.

Yellowish brown. Eyes black. Antennae and legs almost colourless. Body broad and rather flat, slighty covered with powder. Head provided with some very short setae. Eyes very small, composed of 3 facets. Antennae 5-jointed; the 3rd, 4th and 5th joints slightly imbricated, with a few rather long bristles; sensorium very small, somewhat protuberant; the relative length of joints as follows: I-7, II-7, III-14, IV-9, V-14. Rostrum almost reaching the middle coxae. Wax-pores not developed, Abdomen provided with some bristles. Cornicles very short. Cauda short, broadly rounded, not constricted at the base. Anal plate not bilobed. Legs provided with some long bristles; hind tarsi longer than the 3rd antennal joint. Stigma somewhat protuberant.

Length of body-about 0.85 mm. Antenna-about 0.24 mm.

Winged viviparous female.

Head, eyes, antennae and thorax black. Abdomen black, somewhat greenish. Wings almost hyaline; stigma greenish gray; veins gray. Legs dusky.

Nymph (the 2nd instar?) in the gall.

Body narrow, provided with many very long bristles, which are longer than the 3rd antennal joint. Head not fused with the prothorax, provided on the front with 4 spine-like setae which are shorter than the 1st antennal joint. Eyes small, of 3 facets. Antennae short, with a few hairs, 4-jointed, sometimes 5-jointed; in the 4-jointed antennae the 3rd joint almost as long as the basal 2 joints taken together,

with a small sensorium; the 4th almost as long as the 3rd. Lateral and dorsal tubercles absent. Wax-pores not developed. Rostrum reaching the hind coxae. Cornicles large, of lachnid-appearance, provided with about 4 very long bristles. Cauda not distinct. Anal plate not bilobed. Legs slender, with a few long bristles; hind tibiae longer than the antenna; tarsi very long, with 2 rather long slightly knobbed hairs on the tip; hind tarsi longer than the 3rd antennal joint, almost as long as the bristle on the body; claws very long.

Length of body-about 0.8 mm.

Full-grown nymph of winged viviparous female.

(in the gall).

Dark yellowish brown, slightly covered with powder. Body oblong, with a few rather long hairs. Wax-pores not developed. Head not fused with the prothorax, with 4 very short setae on the front. Eyes large, with ocular tubercles. Antennae short, stout, somewhat curved, not imbricated, 5-jointed, with a few moderately long hairs; the 4th joint almost as long as the basal 2 joints taken together, with a small apical sensorium; the relative length of joints as follows: III-37, IV-17, V-19. Tubercles lacking. Cornicles very short, much wider than long, not on cones. Cauda short, broadly rounded, not constricted. Anal plate not bilobed. Legs moderately long, not stout, with some moderately long hairs; hind tibiae somewhat shorter and more slender than the antennae; tarsi long; hind tarsi longer than the 5th antennal joint; claws long.

Length of body-about 1.65 mm.

Many wingless viviparous females and nymphs of the winged form were observed in the galls on December 21, 1922, at Toseikaku, Taichyu, Formosa. Many winged adults, which were probably sexuparae, emerged a few days later. The gall is very large and prominent, measuring about 55-80 mm. in diameter, almost globular in appearance, but is composed of numerous pale greenish branches, and the outer surface is completely covered with a white powder, which is probably secreted by the aphids. The aphids are found among the branches in the gall. This aphis is sometimes not rare in some mountainous regions in Formosa.

Astegopteryx styracophila Karsch.

Aphididae of Formosa-2, p. 54 (1923).

Full-grown nymph of winged viviparous female.

(in the gall).

Body oblong, somewhat covered with powder. Wax-pores not developed.

Head not fused with the prothorax, provided with many very short setae on the front, without horns. Eyes large, with ocular tubercles. Antennae short, stout, somewhat curved, 5-jointed, not imbricated, with a few bristles; the 4th joint with a very small apical sensorium; the relative length of joints as follows: III-38, IV-17, V-25. Rostrum short, not reaching the middle coxae. Thorax and abdomen with a few moderately long bristles. Cornicles very short, much wider than long, scarcely on cones. Cauda short and stout, not constricted. Anal plate not bilobed. Femora somewhat stouter than the antenna; tibiae a little more slender than the antenna, provided with many rather long bristles; hind tibiae almost as long as or slightly longer than the antenna; hind tarsi somewhat longer than the 4th antennal joint.

Length of body-about 1.3 mm.

Astegopteryx quercicola Takah.

(Pl. IV, A, figs. 6-11 and Pl. IV, B, figs. 1-3 and Pl. V, A, figs. 6-7).

Aphididae of Fosmosa-1, p. 93 (1921) and ibid.-2, p. 147 (1923).

Nymph of viviparous female.

In the winged form four nymphal instars are distinguished, as in many species of Aphididae, but in the wingless form only three nymphal instars are to be found.

Full-grown nymph of winged viviparous female.

Orange yellow. Eyes dark reddish brown. Antennae and legs dusky. Wing-pads pale yellow. Cauda yellow. Body somewhat flat, soft, lacking hairs, densely covered with white cottony secretions. Wax-pores well developed, protuberant, circular, of medium or very small size; these pores in a group quite numerous, those in the center of the group much larger. Eyes not distinct, nor protuberant, composed of about 17 facets, of which 3 are much larger. Head rather small, almost fused with the prothorax, the dorsal surface provided with large groups of wax-pores arranged in two pairs, of which the hind pair is much larger. Antennae very stout, somewhat curved, without hairs; 5-jointed; the 4th joint with an extremely minute sensorium at the tip; the 5th furnished with a few long bristles at the apex; the relative length of joints as follows: III-45, IV-20, V-28. Rostrum very short, reaching the front coxae. Pronotum on the dorsum provided with 4 large groups of wax-pores, of which the outer ones are quite large, the largest of the groups of wax-pores on the body. Mesothorax larger than other thoracic segments. Meso- and metathoraces and each abdominal segment (1-5) provided with 4 large groups of wax-pores on the dorsum, but the 6th and 7th abdominal segments each with 3

such groups; these groups of wax-pores transversely oval or narrowed in shape. Cornicles represented almost as mere pores. Cauda much wider than long, rounded, not constricted at the base, without hairs. Anal plate not bilobed. Legs rather short, almost as stout as, or a little more slender than, the antenna, provided with but 2 or 3 very long bristles near the apices of tibiae; tarsi very short, shorter than the 4th antennal joint, provided with a few very long bristles.

Length of body-about 1.0 mm. Antenna-about 0.5 mm.

Nymph (the first instar) of winged viviparous female.

Yellow. Eyes almost black. Antennae slightly dusky. Legs almost colourless. Body oval, almost 2.8 times as long as the antenna, rather flat, without hairs, covered with some white secretions; the segments not well-defined. Wax-pores well-developed, numerous, circular, very small and of the same size, distributed almost as in the grown nymph of the winged form. Head fused with the prothoax. Eyes very small, composed of 3 facets. Antennae not stout, more slender than the leg, 3 or 4-jointed, imbricated; the 1st joint almost as large as the 2nd, provided with a moderately long bristle; the 3rd almost as long as, or very slightly longer than, the 4th, with a very small apical sensorium, without hairs, the 4th almost as long as the basal two jonts taken together, with a few very long bristles at the tip. Rostrum reaching a little beyond the middle coxae. Cornicles absent. Cauda not visible. Anal plate not bilobed. Legs comparatively large, stout, tibiae slightly imbicated, with a few moderately long bristles at the tip; hind tibiae a little shorter than the 3rd and 4th antennal joints taken together; tarsi provided with some very long hairs.

Length of body-about 0.4 mm.

The antennae of the 2nd and the following instars (winged form) are very stout, somewhat curved, not imbricated, and are 5-jointed, although the joints are not well defined.

Nymph of wingless viviparous female.

(The first instar) Differs from the nymph (the 1st instar) of the winged form in the following characters:

(1) Antennae somewhat shorter, usually 3-jointed; the 3rd joint about 2.5 times as long as the basal two joints taken together.

(2) Body provided with many rather large, somewhat protuberant circular wax-pores arranged in a single row along the whole margin of the body, but not on the dorsum. Wax horizontally protruding from each pore on the margin of the body and elongate in shape.

(The second instar) Differs from the 1st in the following characters:

(1) Body slightly larger.

(2) Antennae very small, not imbricated, 2-jointed; the 1st joint as long as, or somewhat larger than, the 2nd, the latter without hairs; sensoria not distinct.

(3) Legs much shorter; front and middle pairs of legs without tarsi or distinct hairs; hind tarsi only one-jointed, without claws but with a few long hairs which are scarcely capitate.

(The third instar) Differs from the 2nd in the following characters:

(1) Body a little wider.

(2) Antennae much smaller, only one-jointed.

Wingless vipiparous female (abult).

Black. Body aleyrodiform, being cemented to the leaf, flat, almost circular when seen from above, with the terminal part somewhat protruding, very hard, lacking hairs and wax; the segments not defined. Antennae and eyes not visible. Anal plate distinctly bilobed, provided with some very long bristles.

Length of body-about 0.9 mm.

Winged viviparous female (adult).

Head, eyes, antennae and thorax almost black. Abdomen dusky yellowish brown. Wings slighty clouded along the 1st and 2nd obliques; stigma and veins gray. Legs gray, darker on the distal halves of femora and the apices of tibiae. Cauda yellowish brown. The morphological characters were described in the original description.

Astegopteryx fici Takah.

(Pl. IV, B, fig. 4, & Pl. V, B, figs. 3-7)

Aphididae of Formosa-2, pp. 55 and 146 (1923).

Full-grown nymph of winged viviparous female.

Head, eyes, antennae, legs and wing-pads black. Thorax dark yellowish brown. Abdomen blackish or dark yellowish brown. Tubercles on the dorsal surface black.

Body stout, provided with some very short blunt tubercles of peculiar form, these furnished with from 1-3 very small tubercles and 2 or 3 very long bristles arising from much smaller tubercles, on the dorsum, somewhat covered with a powder. Wax-pores not developed. Head and pronotum fused together. Head rather small, provided with about 10 very long stout bristles on the dorsum and a pair of blunt tubercles between the eyes; and sometimes with a pair of very small

groups of wax-pores (3 pores in a group) present at the middle of the dorsal surface. Eyes not protruding, 3 facets on the hind margin much larger than other facets and protruding. Antennae short, very stout, almost as stout as or more so than the legs, curved backwards along the side of the head, 5-jointed; the 1st joint provided with a long bristle; the 2nd, 3rd and 4th without hairs; the 5th with a few long hairs on the tip; sensoria extremely small; the relative length of joints as follows: III-43, IV-16, V-17. Rostrum stout, very short, reaching slightly beyond the hind margin of the prothorax. Pronotum provided with 4 tubercles. Mesothorax very large, provided with some long bristles and with 4 tubercles on the dorsum. Wing-pads rather small. Metanotum with 4 tubercles. Abdomen with 6 tubercles on either side and 2 similar pairs at the middle of the dorsal surface. Cornicles very short, striate, of lachnid-appearance, without hairs. Cauda much wider than long, not constricted, with a few rather short bristles. Anal plate not bilobed. Legs very stout, tibiae provided with some or many very long bristles; tarsi stout, almost as long as the 5th antennal joint, with some long bristles; claws very short.

Length of body-about 1.5 mm. Antenna-about 0.38 mm.

Grown nymph of wingless viviparous female.

Yellowish. Body oval, somewhat flattened, very slightly covered with a powder; the segments not defined; without tubercles, provided with 22 very long bristles arising from very small tubercles along the whole margin, 5 short bristles on the side of the terminal part and a few very short hairs on the dorsum. Eyes small, composed of 3 facets. Antennae very short, almost as long as the bristle on the margin of the body, 3-jointed, arising from the under side of the head. Head and thorax provided with a few pairs of small groups of indistinct wax-pores? Cornicles absent. Cauda not distinct. Anal plate not bilobed. Legs very short; hind tibiae provided with a few long bristles on the tip; tarsi 1-jointed; hind tarsi almost as long as the 3rd antennal joint, furnished with a few very long bristles.

Length of body-about 0.6 mm.

Nymph (the 1st instar)

Yellow. Head very slightly dusky. Eyes almost black. Antennae and legs dusky. Body oval, rather flat, without tubercles or wax, almost twice as long as wide, almost 3.4 times as long as the antenna, the segments ill-defined; the body provided with 34 long stout hairs along the whole margin, these almost as long as the 3rd antennal joint, with 4 or 5 pairs of similar hairs on the middle of the dorsum. Eyes small, of 3 facets. Antennae imbricated, arising from the lower side

of the front, 4-jointed, furnished with a few bristles; the 3rd joint slightly longer than the basal 2 joints taken together, with a small apical protuberant sensorium; the 4th almost as long as the 3rd, provided with a few very long bristles at the tip, these almost as long as the 4th antennal joint. Rostrum reaching the middle coxae. Cornicles and cauda not visible. Anal plate not bilobed. Legs comparatively large, stout, more so than the antenna; tibiae provided with a few very long bristles at the tip; hind tibiae almost as long as the 3rd and 4th antennal joints taken together; tarsi furnished with a few very long bristles. Body about 0.38 mm.

Many nymphs of the winged viviparous female were observed on *Ficus retusa* on December 23, 1922, and January 17, 1923, at Taihoku. The full-grown nymph of the winged form of *A. fici* Takah. resembles that of *A. cuspidatae* Essig et Kuw. in having tubercles on the abdomen.

Full-grown nymph of winged form of *A. cuspidatae* Essig et Kuw.: Body stout, with some very long stout hairs, provided with numerous very small wax-pores which are rather irregular in shape and scattered over the dorsal surface as in the apterous form of *Oregma bambusicola* Takah. Head and pronotum not fused together. Antennae very stout, 5-jointed. Abdomen near the sides furnished with about 7 short stout blunt tubercles, from each of which a very long bristle arises.

Some wingless forms of *A. fici* Takah. were seen on *Ficus retusa* on November 27, 1923, at Shijukei, Koshun, Formosa.

Aleurodaphis blumeae v. d. Goot.

Aphididae of Formosa-1, p. 92 (1921); Aphididae of Formosa-2, p. 150 (1923).

syn. *Astegopteryx japonica*, Takahashi, Aphididae of Formosa-2, p. 67 (1923).

Nymph of wingless viviparous female.

(The first instar) Pink. Eyes black. Antennae and legs almost colourless to pale pinkish. Wax protruding from the wax-pores arranged around the whole margin of the body.

Body oblong, soft, about 2.7 times as long as the antenna, almost twice as long as wide. Wax-pores small, circular, somewhat protuberant, more than 100 in number, arranged in a single row around the whole margin of the body, not present on the dorsum.

Head large, without horns, fused with the prothorax, provided with a pair of rather long bristles and 2 short hairs on the front. Frontal tubercles lacking. Eyes small, of 3 facets which are larger than the wax-pore. Antennae short, 4-jointed;

the basal 2 joints each provided with a moderately long hair; the 3rd and 4th provided with minute spinules; the 3rd with a rather short hair near the tip, the sensorium circular and rather small; the 4th with a few hairs; the relative length of joints as follows: III-15, IV-16. Rostrum slender, reaching beyond the hind coxae. Abdomen provided with about 7 pairs of minute setae on the middle of the dorsum, without tubercles. Cornicles almost reduced to pores, larger than the facet. Cauda very short, broadly rounded, not constricted, provided with a pair of long bristles. Anal plate not bilobed. Legs stout, stouter than the antenna, provided with some very long bristles on the distal halves of tibiae, and the tarsi; tarsi provided with 2 very long knobbed hairs; hind tarsi almost as long as the 3rd antennal joint.

Length of body-about 0.5 mm.

The fully-grown nymph is provided with 4-jointed antennae and wax-pores arranged in a single row around the whole margin of the body, as in the first instar.

Some wingless viviparous females with the antennae 5-jointed were collected on *Blumea chinensis* on February 16, 1923, near Taihoku.

Many wingless viviparous females were observed on July 15, 1923, near Taihoku. Some wingless ones were collected on November 26, 1923, at Kusukusu, Koshun, Formosa.

Nurudea shiraii Mats.

Aphididae of Formosa-1, p. 95 (1921).

Numerous wingless viviparous females and their young were observed in a gall on *Rhus semialata* on September 8, 1923, at Taihoku.

The winged adults appeared in the same gall two weeks later. The wingless viviparous female is very small and distinctly convex on the dorsal surface, with the eyes composed of 3 facets and the antennae very short, being 4-jointed. The mesonotum of the winged form is provided with a pair of wax-plates which were erroneously described as being lacking in the previous paper.

Eriosoma clematicola n. sp.

(Pl. X, A, fig. 6)

Winged viviparous female.

Almost black, with the abdomen slightly greenish. Head, eyes and antennae black. Frontal tubercles lacking. Eyes large, with very small ocular tubercles. Ocelli rather large. Antennae very long, 6-jointed, without hairs; the 3rd joint somewhat stouter than the 4th, provided with about 40-45 very narrow annular sensoria which almost completely encircle the segment and are regularly distributed

throughout the whole length of the segment; the 4th with from 13 to 14 similar sensoria; the 5th slightly more slender than the 4th, with about 18 similar sensoria; the 6th with about 10 similar sensoria; the relative length of joints about as follows: III-170, IV-50, V-64, VI-45. Rostrum slender, reaching beyond the hind coxae. Fore wings ample, the 1st oblique scarcely curved, the 2nd very slightly curved, these two veins arising quite close together; the 3rd obscured for some distance at its base, once branched, the upper branch extending nearly to the apex of the wing; stigmatie vein long, somewhat curved; hind wings with 2 divergent obliques; hooklets 4. Abdomen rather broad, without wax-pores. Cornicles on somewhat elevated tubercles which are furnished with a few long stout hairs. Cauda very short, inconspicuous. Legs slender; tibiae more slender than the 3rd antennal joint, with many moderately long setae; tarsi slender, not imbricated; hind tarsi as long as the 6th antennal joint.

Length of body about 2.7 mm. Antenna-about 1.6 mm.

Fore wing-about 3.5 mm.

Wingless viviparous female.

Brownish. Body provided with some long stout bristles. Head furnished with 6 small groups of wax-pores between the antennae and 4 similar groups arranged in a transverse row between the eyes. Each of these groups consisting of from 5-9 very small circular wax-pores. Eyes composed of 3 facets. Antennae long, 6-jointed, with a few short setae; the 3rd joint the longest; the 5th much longer than the 4th, as long as the 6th, with a small circular sensorium near the tip. Each thoracic and abdominal segment with 6 or more groups of very small wax-pores arranged in a transverse row on the dorsum. Legs long, with some rather long setae; hind tarsi a little longer than the 5th antennal joint.

Length of body-about 3.0 mm.

The fully-grown nymphs of the winged form are brown in colour, and are provided with some long stout bristles and well-developed wax-pores in groups on the dorsum of abdomen.

Host.-*Clematis fouriana,* attacking the stem.

Distribution.-Formosa: Kusukusu, Koshum.

The author found many winged females and their nymphs grouped quite densely on the host on November 24, 1923. This aphis differs from other species of *Eriosoma* in having longer antennae, as well as in certain characters of the wax-pores.

Certain Japanese Aphididae.

Macrosiphum esakii n. sp.

(Pl. IX, B, figs. 5-7)

Wingless viviparous female.

Differs from *M. paederiae* Takah. (Aphididae of Formosa-1, p. 11) in the following characters:

(1) Shining black.

(2) Antennae provided with some moderately long slightly knobbed setae. (In *M. paederiae,* antennae with some very short similar setae).

(3) Cornicles cylindrical, more slender, expanded at the base, but not about the middle, imbricated.

(4) Body smaller, measuring about 2 mm. in length.

The cornicles are scarcely reticulated at the tip as in *M. paederiae* Takah.

Host.-*Paederia tomentosa.*

A few wingless forms were collected by Mr. T. Esaki and the author at Hakozaki, near Fukuoka, Japan, on June 2, 1923.

Macrosiphum smilaceti n. sp.

Wingless viviparous female.

Shining red, with black dorsal markings. Cornicles black. Cauda not black. Apices of femora and tibiae, and tarsi black. Body in form as in *M. rosae* L. Head on the dorsal surface provided with about 10 rather long normal setae. Frontal tubercles large, very slightly convex on the inner side which is furnished with 2 setae. Antennae long and slender, with some moderately long stout setae which are not capitate; the 3rd joint with 5 or 6 rather small circular sensoria in a row near the base; the 4th slightly imbricated, without sensoria; the relative length of joints about as follows: III-165, IV-110, V-95, VI-208 (30+178). Rostrum reaching beyond the middle coxae. Abdomen with some moderate or rather long normal setae on the dorsum. Cornicles cylindrical, very stout, moderately expanded toward the base, not dilated at the base, somewhat curved, imbricated, not reticulated, about 4 or 5 times as long as wide, longer than the 4th antennal joint, about 1.5 times as long as the cauda. Cauda large, stout with about 3 pairs of long lateral bristles. Legs long; tibiae stouter than the antenna, provided with many moderate or rather long stout setae which are not capitate; hind tarsi slightly longer than the basal part of the last antennal joint.

Length of body-about 2.6 mm. Antenna-about 3.0 mm.
Cornicle-about 0.58 mm.

Winged viviparous female.

Frontal tubercles large, somewhat convex on the inner side. Antennae long and slender, with some moderately long normal setae; the 3rd joint provided with about 20 moderate or rather large somewhat protuberant circular sensoria arranged almost in a row nearly over the whole length; the 4th somewhat imbricated, without sensoria; the relative length of joints about as follows: III-180, IV-125, V-105, VI-230 (30+200). Rostrum reaching the middle coxae. Wings hyaline, with normal veins. Abdomen with some moderate or rather long setae. Cornicles large, stout, cylindrical, somewhat expanded toward the base, not dilated at the base, not curved, imbricated, not reticulated, about twice as long as the cauda, about 5 or more times as long as wide, almost as long as the 4th antennal joint. Cauda much longer than wide, gradually tapering, rather stout, with about 4 pairs of long lateral bristles. Legs long and slender; tibiae somewhat stouter than the antenna, provided with many rather long normal setae; hind tarsi a little longer than the basal part of the last antennal joint.

Length of body-about 2.7 mm. Antenna-about 3.5 mm.
Fore wing-about 4.0 mm? Cornicle-about 0.6 mm.

Host.-*Smilax chinensis.*

Distribution.-Japan: Tokyo, Oi in Gifu prefecture, Kyoto. One winged and a few wingless forms were collected by the author in June, 1923.

This aphis can be easily distinguished from *M. smilacifoliae* Takah. (Aphididae of Formosa-1, p. 12) by the nature of the cornicles which are stouter and not reticulated.

Myzus rhois n. sp.

Wingless viviparous female.

Shining brown. Cornicles black. Antennae black, with the 3rd joint brownish. Femora except the bases black, tibiae with black apices. Body oval. Eyes moderate in size. Frontal tubercles short, distinctly convex on the inner side. Antennae rather stout, imbricated, almost without hairs; the 1st joint much larger than the 2nd, slightly convex on the inner side; the 3rd provided with 1-3 small circular sensoria near the base; the 4th without sensoria; the 5th with the usual sensorium rather small placed near the tip; the relative length of joints about as

follows: III-90, IV-60, V-50, VI-125 (30+95). Rostrum reaching the middle coxae. Abdomen without tubercles, scarcely provided with setae. Cornicles very stout, cylindrical, somewhat expanded toward the base, not dilated at the base, scarcely curved, somewhat imbricated, not reticulated, about 4 or slightly more times as long as wide, almost as long as the 3rd antennal joint, about twice or slightly more times as long as the cauda. Cauda very stout, longer than wide, tapering, with the apex rounded, with 2 slight constrictions, furnished with 2 pairs of long lateral bristles.

Legs rather stout; tibiae stouter than the antenna, with many moderate or rather long normal setae; hind tarsi almost as long as, or shorter than, the basal part of the last antennal joint.

Length of body-about 1.7 mm. Antenna-about 1.8 mm.
Cornicle about 0.4 mm.

Winged viviparous female.

Head on the dorsal surface furnished with about 10 very short scarcely knobbed setae. Frontal tubercles short, distinctly convex on the inner side. Antennae slender, imbricated, without distinct hairs; the 3rd joint provided with 9-11 small to rather large circular sensoria arranged in a row almost over the whole length; the 4th without sensoria; the relative length of joints about as follows: III-80, IV-60, V-48, VI-140 (30+110).

Rostrum reaching the middle coxae. Wings very slightly clouded along the veins, with normal venation; veins very stout; hind wings with 2 almost parallel obliques; hooklets 2 or 3. Cornicles in shape as in the wingless form but much shorter, almost 4 times as long as wide, imbricated, indistinctly reticulated on the distal part, a little longer than the 4th antennal joint, almost twice as long as the cauda. Cauda smaller than that of the wingless form, tapering, with the apex rounded, provided with 2 pairs of long lateral bristles. Legs slender; tibiae provided with many moderately long normal setae; hind tarsi shorter than the basal part of the last antennal joint.

Length of body-about 1.9 mm. Antenna-about 1.8 mm.
Fore wing-about 2.8 mm. Cornicle-about 0.3 mm.

Host.-*Rhus vernicifera.*

Distribution.-Japan: Hakozaki near Fukuoka.

Many viviparous females were collected by the author on June 2, 1923.

Myzus sasakii Mats?

Matsumura, Jl. Coll. Agr. Sapporo, vii, 6, p. 404 (1917); Takahashi, Aphididae of Formosa, 2, p. 81 (1923).

Wingless viviparous female.

Black. Cornicles black. Body oval, covered with numerous minute granular spinules on the dorsal surface. Head rather small, on the dorsal susface with a few short slightly capitate setae, of which those on the front are somewhat longer. Eyes moderate in size. Frontal tubercles moderately convex on the inner side, not very large. Antennae much shorter than the body, rather stout, imbricated, with a few short slightly capitate hairs; the 1st joint larger than the 2nd; the 3rd without sensoria; the 5th with a rather large circular sensorium near the tip; the relative length of joints about as follows: III-40, IV-20, V-18, VI-45 (15+30). Rostrum reaching the middle coxae. Dorsal and lateral tubercles lacking. Abdomen with a few short slightly capitate setae arranged in a transverse row on the dorsum of each segment. Cornicles short, stout, somewhat curved, somewhat narrowed toward the apex on the distal half or one-third, not or scarcely expanded at the base, about 3 or more times as long as wide, narrowest near the tip, two or more times as long as the cauda, almost as long as or slightly longer than the 3rd antennal joint, imbricated, not reticulated, with a few short scarcely capitate setae. Cauda stout, stouter than the cornicle, almost as long as wide, tapering on the distal half, with 3 pairs of long lateral bristles. Legs long; tibiae stouter than the antenne, more slender than the cornicle, with many not or scarcely knobbed setae; hind tarsi almost as long as the cauda.

Length of body-about 1. 4 mm. Antenna-about 0. 8 mm.

Winged viviparous female.

Head provided with many minute granular spinules and a few short scarcely knobbed setae on the dorsal surface. Frontal tubercles short, somewhat convex on the inner side. Antennae slender, with a few short scarcely knobbed setae; the 1st joint larger than the 2nd; the 3rd provided with about 30-35 rather large circular or oval sensoria scattered over the whole length; the 4th somewhat imbricated, with about 8-15 similar sensoria scattered over the whole length; the 5th with 0-2 secondary sensoria, the apical sensorium large; the relative length of joints about as follows: III-80, IV-40, V-30, VI-102 (22+80). Rostrum reaching the middle coxae. Pronotum provided with many minute granular spinules. Wings hyaline, with normal veins; hind wings with 2 somewhat divergent obliques; hooklets 4. Abdomen with many minute spinules and a few short setae. Cornicles short, cylindrical, not curved, scarcely or slightly expanded toward the base, not expanded at the base, imbricated, not reticulated, about 3 or 4 times as long as wide, about 3 times as long as the cauda, almost as long as the 4th antennal joint, furnished with a few short scarcely knobbed setae. Cauda stout, almost as long as wide, tapering on the distal half, with the apex rather pointed, with about 3 pairs of long lateral bristles. Legs long and slender; tibiae almost as stout as the antenna, but much more slender than the cornicle, with many long setae which are not knobbed; hind tarsi as long as the cauda or the basal part of the last antennal joint.

Length of body-about 1.7 mm. Antenna-about I.4 mm.

Fore wing-about 2.4 mm.

Brachypterous viviparous female.

Differs from the wingless form in the following characters:

(1) Ocelli present, but much smaller than those of the macropterous form.

(2) The 3rd antennal joint provided with about 20 very small circular sensoria scattered over the whole length; the 4th with about 10 similar sensoria; the 5th with 2 similar ones and an apical larger sensorium.

(3) Mesothorax somewhat elongated, convex on the sides.

(4) Brachypterous.

(5) Length of body-about 1.7 mm.

Body covered with many minute granular spinules as in the wingless form.

Only one specimen was collected.

Host.-*Prunus donarium*.

Distribution.-Japan (Tokyo, Oi in Gifu-prefecture), Formosa.

Many specimens were collected by the author in the rolled leaves of the host on June 6, 1923, at Oi, Gifu-prefecture, Japan.

Neophorodon rubi Takah.

Aphididae of Formosa-2, pp. 17 and 84 (1923).

Wingless viviparous female.

White. Eyes black. Antennae dusky, paler at the base? Cornicles white, with dusky tips? Cauda white. Body oval, provided with many long capitate hairs, each arising from a very small tubercle on the dorsal surface, as in specimens from Formosa. Frontal tubercles distinct, slightly convex on the inner side, which is provided with 2 longer capitate hairs. Eyes distinctly protruding, with large ocular tubercles. Antennae slender, provided with a few very short stout capitate hairs; the 1st joint much larger than the 2nd, on the inner side with a arge

projection which is almost as long as the 2nd antennal joint, with 2 capitate hairs at the apex; the 3rd slightly imbricated on the distal portion, without sensoria; the 4th, 5th and 6th imbricated; the relative length of joints about as follows: III-40, IV-27, V-30, VI-75 (20+55). Rostrum reaching beyond the middle coxae? Capitate hairs on the abdomen as long as the 2nd antennal joint, but those on the hind part of the abdomen much longer. Cornicles long, as long as the 6th antennal joint (base and spur), moderately dilated on the distal half and at the base, broadest at the base, not curved, scarcely imbricated, not reticulated. Cauda stout, much shorter than the cornicle. Legs long and slender, provided with many rather long scarcely knobbed hairs; hind tarsi a little shorter than the base of the last antennal joint.

Length of body-about 1.0 mm. Antenna-about 1.0 mm.

Cornicle-about 0.3 mm.

Host.-unknown in Japan.

Distribution.-Formosa, Japan.

A wingless viviparous female was collected by the author on June 4, 1923, at Kyoto, Japan. Hitherto unrecorded from Japan. The Japanese specimen differs somewhat from the Formosan specimens, but seems to belong to this species.

Myzus (?) **polygoni** (v. d. Goot).

(Pl. IX, A, fig. 9 and B, figs. 1-2).

Phorodon polygoni, van der Goot, Contrib. Fauna Indes Neerland., 1, 3, p. 44 (1918).

Host.-*Polygonum* sp.

Distribution.-Japan: Tokyo, Kyoto. Java.

Many wingless viviparous females were collected in June 1923. Hitherto unrecorded from Japan.

The Japanese specimens agree almost exactly with the original description, differing from it, however, in the following characters:

(1) Yellow, cornicles yellow.

(2) The last antennal joint shorter; the relative length of antennal joints about as follows: III-85, IV-63, V-57, V- 128 (23+105).

(3) Rostrum shorter, reaching the middle coxae.

This aphis is not a typical *Myzus* and seems to represent a new genus, but the author hesitates to propose a new generic name for it, since the winged form has never been collected.

Amphorophora indica van der Goot.

Rhopalosiphum indicum, van der Goot, Records Ind. Mus., XII, pt, 1, no. 1, p. 2 (1916) and Ibid. XIII, pt. IV, no. 1, p. 176 (1917); Essig and Kuwana, Proc. Calif. Acad. Sc. 4th series, viii, 3, p. 55 (1918).

Amphorophora indicum, Takahashi, Aphididae of Formosa-1, p. 28 (1921), Japanese Aphididae-1, p. 21 (1921) and Aphididae of Formosa-2, p. 87 (1923).

syn. *Rhopalosiphum miniatum*, Matsumura, Trans. Sapporo Nat. Hist. Soc, VII, pt. 1, p. 12 (1918).

Rhopalosiphum hemerocallidis, Matsumura, Trans. Sapporo Nat. Hist. Soc. VII, pt. 1, p. 12 (1918).

Nectarosiphum mitsubautsugii, Shinji, Dobutsugaku Zasshi, p. 308 (1923).

Many winged and wingless viviparous females were collected on *Hemerocallis* at Meguro, Tokyo, in June, 1923, by the author.

Fullawayella formosana Takah.

Aphididae of Formosa-1, p. 29 (1921) and Aphididae of Formosa-2, pp. 33 & 89 (1923).

Hosts.-*Lycoris sanguinea* Maxim. (Amaryllidaceae).

Lilium fistulosum. L. (Liliaceae).

Distribution.-Formosa; Japan: Tadono in Wakayama-prefecture. Hitherto unrecorded from Japan.

Mr. M. Kurisaki collected this species on the hosts above mentioned on May 5 and 6, 1920, at Tadono.

Pergandeidia thalictri (Mats.)

Yezosiphum thalictri, Matsumura, Trans. Sapporo Nat. Hist. Soc., vii, pt. 1, p. 7 (April, 1918).

Aphis thalictrii, Essig and Kuwana, Proc. California Acad. Sc., 4th series, viii, 3, p. 78 (July, 1918).

Host.-*Thalictrum minus*.

Distribution.-Japan: Tokyo, Sapporo, Kyoto.

Numerous viviparous females, both winged and wingless, were collected by the anthor at Kyoto, on June 4, 1923.

This species is closely related to *P. spondylii* Koch (Pflanzenl. p. 17), but differs from it in the antennal structure. The aphis is distinct from *Brachycolus thalictri* Koch.

Cervaphis quercus Takah.

(Pl. VIII, B, figs. 6-8)

Dobutsugaku Zasshi (Zool. Mag. Tokyo), xxx, No. 361, p. 458 (1918); Aphididae of Formosa-1, p. 69 (1921), Aphididae of Formosa-2, p, 118 (1923).

Diverosiphum kunugii, Shinji, Dobutsugaku Zasshi (Zool. Mag. Tokyo), xxxiv, No. 407, p. 791 (1922).

Winged viviparous female.

Yellow. Head and thorax brownish. Eyes red. Antennae black. Abdomen with a large brownish patch and some brownish bands and spots on the dorsum. Cornicles almost black.

(Colour notes from specimens preserved in alcohol). Body narrow. Head provided with about 16 very short hairs, and a pair of horn-like tubercles between the antennae; the tubercles much shorter than the 1st antennal joint, much longer than wide, rather sharply pointed, provided with a few very short stout setae which are not pointed Eyes large, with the ocular tubercles distinctly protruding as in *Greenidea*. Front ocellus not visible from above. Frontal tubercles very short. Antennae imbricated, short, 5-jointed, provided with a few moderately long stout hairs; the 1st joint almost as long as the 2nd, convex on the inner side; the 3rd almost as stout as the front tibia, provided with 5-9 mostly large protuberant circular sensoria arranged in a single row over the whole length; the 4th with only an apical sensorium which is rather large, circular and not surrounded by hairs; the relative length of joints about as follows: III-67, IV-43, V-65 (30+35).

Rostrum slender, almost reaching the middle legs. Prothorax provided with a small horn-like tubercle, which in shape and size is almost like those on the head, on the notum near the front angle, and a short stout blunt tubercle on either side near the hind angle. Wing-veins rather stout; subcosta on the front wing provided with about 10 minute sensoria, without hairs; the 1st oblique only slightly or scarcely curved; the 2nd somewhat curved toward the base of the wing on the distal part; the 3rd only once forked, obsolete at the base; stigmatic vein very slightly curved, extending to the apex of the wing; hind wings with only one oblique; hooklets 2. Spiracles slightly protruding. Abdomen with 3 quite minute tubercles which are provided with some tiny hairs on the sides, and with a pair of minute horn-like tubercles, that are rather sharply pointed, at the middle of the dorsum behind the cornicle, and with some very short setae on the dorsum. Cornicles very long and slender, very slightly expanded on the distal portion, somewhat expanded at the base, somewhat curved, rather stouter than the hind tibia, imbricated throughout except on the basal portion, not reticulated, almost as long as the 3rd, 4th and 5th antennal joints taken together, provided with a few rather long stout hairs on the distal portion and with a few similar hairs distributed throughout the whole length. Cauda wider than long, lacking a process, provided with many very long hairs. Anal plate very short, rounded, provided with many long hairs. Legs slender, with many rather long setae on the tabia; hind tarsi shorter than the base of the last antennal joint.

Length of body-about 1.75 mm. Antenna-about 1.0 mm.
Fore wing-about 2.5 mm. Cornicle-about 0.8 mm.

Fully-grown nymph of winged viviparous female.

Body provided with many branched projections as in the wingless form. Eyes large, with ocular tubercles. Antennae short, 4-jointed; the relative length of joints about as follows: III-53, IV-43 (19+24). Cornicles longer than the projections on the body, imbricated, provided with few hairs. Cauda with a process.

Many winged and wingless viviparous females were collected by the author on the leaves of *Quercus serrata* on June 20, 1923, at Meguro, near Tokyo.

Calaphis magnolicolens Takah.

Japanese Aphididae-1 (published by the author), p. 27 (1921); 高橋良一著作集第二號, p. 24 (1921); Aphididae of Formosa-2, p. 125 (1923).

Winged viviparous female.

White or pale yellow. Eyes red. Antennae white, with the apices of joints dusky. Legs white, apices of tibiae and tarsi black. Wings hyaline, stigma colorless, veins pale yellowish brown. Cornicles, cauda and abdominal tubercles white. Body oblong, soft, without wax. Head provided with a few long bristles. Eyes rather small, with small ocular tubercles. Frontal tubercles very short. Antennae very long and slender, almost without hairs; the 1st joint much larger than the 2nd; the 3rd more slender than the tibia, provided with from 8-15 circular or subcircular sensoria of medium to large size arranged in a single row, mostly on the basal half; the 4th slightly striate, without sensoria; the relative length of joints about as follows: III-38, IV-24, V-23, VI-50 (7+43), Rostrum almost reaching the middle coxae. Wings not narrow; stigma with a few long bristles; the 3rd oblique twice forked, reaching the apex of the wing; hind wings with 2 divergent obliques; hooklets 2. Abdomen without distinct tubercles, provided with some long bristles. Cornicles somewhat expanded toward the base longer than wide at mid-

length, not reticulated. Cauda not constricted at the base, provided with many long bristles. Anal plate bilobed, but not deeply so, provided with some long bristles. Legs very long and slender, with many long bristles; hind tarsi almost as long as the basal part of the 6th antennal joint.

Length of body-about 2.5 mm. Antenna-about 3.0 mm.

Fore wing-about 3.0 mm.

Host.-*Magnolia hypoleuca.*

Distribution.-Japan (Tokyo).

Some winged viviparous females were collected by the author in June, 1923, at Tokyo.

Chromaphis carpinicola Takah.

Japanese Aphididae-1, p. 27 (1921); 高橋良一著作集第二號, p. 21 (1921); Aphididae of Formora-2, p. 126 (1923).

Winged viviparous female.

Dark brown. Wings almost dark brown. Body stout, provided with many long bristles. Head large, on the dorsal surface provided with about 16 long bristles which are much longer than the 1st antennal joint. Eyes very large, with distinct ocular tubercles. Ocelli rather small. Frontal tubercles lacking. Antennae slender, shorter than the body, provided with a few long bristles which are much shorter than those on the head, together with many minute spinules; the 3rd joint provided with from 10-13 very large oval to circular sensoria arranged in a single row over almost the whole length; the 4th without sensoria; the relative length of joints about as follows: III-73, IV-42, V-40, VI-33 (30 + 3). Rostrum not reaching the middle coxae. Wings rather narrow, imbricated; stigma with a few long bristles; veins rather stout; the 1st and 2nd obliques somewhat curved; the 3rd twice-forked; stigmatic vein almost obsolete; hind wings with 2 slightly divergent obliques; hooklets 2 or 3. Abdomen with some very small blunt tubercles near the sides, the dorsal ones almost lacking. Cornicles very small, much smaller than the cauda, and much smaller than those of the fully-grown nymph, almost as long as or wider than long, slightly expanded at the base, not reticulated. Cauda globular, constricted at the base, with some very long bristles. Anal plate bilobed, each lobe almost as wide as the cauda, provided with many very long bristles. Legs slender, with many long bristles; tibiae stouter than the antenna; tarsi provided with many minute spinules, transparent empodial hairs present; hind tarsi slightly shorter than the 6th antennal joint.

Length of body-about 1.7 mm. Antenna-about 1.1 mm.

Fore wing-about 2.5 mm.

Host.-*Carpinus spp.*

Distribution-Japan (Tokyo).

The fully-grown nymph of the winged form differs from the adult in the following characters:

(1) Body oval.

(2) Hairs on the body much longer, stouter, each arising from a very small tubercle.

(3) Eyes smaller; ocelli absent.

(4) Antennae shorter, stouter, without sensoria on the 3rd antennal joint; with a few very long stout bristles which are almost as long as those on the head.

(5) Rostrum reaching beyond the middle coxae.

(6) Wings very short.

(7) Abdomen without tubercles near the sides.

(8) Cornicles much larger, expanded toward the base, constricted near the tip, slightly longer than wide at midlength.

(9) Cauda not constricted at the base, tapering, with the apex rounded, provided with a few long bristles.

(10) Anal plate not bilobed.

(11) Legs shorter, stouter, with some much stouter bristles; hind tarsi longer than the 6th antennal joint.

Shivaphis celticolens (Essig et Kuw.)

Chromaphis celticolens, Essig and Kuwana, Proc. California Acad. Sc. 4th series, VIII, 3, p. 95 (1918).

Phyllaphis celticolens, Takahashi, Trans. Sapporo Nat. Hist. Soc. p. 195 (1919).

Shivaphis celticolens, Baker, Bull. U. S. Dept. Agr. no. 823, p. 24 (1920); Takahashi, Aphididae of Formosa-2, p. 130 (1923).

Brachypterous viviparous female.

Differs from the macropterous form in the following characters:

(1) Ocelli rudimentary.

(2) Thorax not well developed.

(3) Wings very short.

The sensoria on the 3rd antennal joint seem to be fewer in number than those

of the macropterous form, since a specimen of this form in my collection is provided with only 3 sensoria on the 3rd antennal joint. In the brachypterous form of *Myzocallis kuricola* (Mats.) the ocelli are as well developed as are those of the macropterous form. *S. celticolens* is quite closely allied to *S. celti* Das (Aphididae of Formosa-1, p. 74 and ibid-2, p. 131) and it is almost impossible to distinguish them by structural characters, but the former species differs from the latter in the following characters:

(1) Brachypterous forms appear very commonly in almost every generation.

(2) Body more covered with wax.

Neophyllaphis podocarpi Takah.

(Pl. IX, A, figs. 1-8)

Canad. Ent. p. 19 (1920); Aphididae of Formosa-1, p. 77 (1921); Aphididae of Formosa-2, p. 129 (1923).

syn. *Mindarus podocarpi*, Shinji, Dobutsugaku Zasshi (Zool. Mag. Tokyo) xxxiv no. 402, p. 532 (1922).

Winged male.

Colour almost as in the winged viviparous female. Head large, with a few short hairs on the dorsal surface. Eyes large, with the ocular tubercles distinctly protuberant. Ocelli rather large. Frontal tubercles lacking. Antennae long, provided with many minute spinules on the distal part of the 3rd joint, and on the 4th, 5th and 6th joints, together with a few short rather fine hairs; the 1st larger than the 2nd; the 3rd rather stout, more so than the front tibia, furnished with about 80 small transversely narrowed sensoria, which are very slightly protuberant, irregularly scattered over the entire length; the 4th almost as stout as the front tibia, provided with about 25 oval sensoria, which are rather small and not protuberant, scattered ever the whole length; the 5th with about 15 similar sensoria and an apical small circular one; the 6th with a few similar ones on the basal part; the relative length of joints about as follews: III-100, IV-48, V-48, VI-42 (35+7). Rostrum reaching beyond the hind coxae. Wings as in the female; subcosta on the front wing provided with 5 minute circular sensoria in a single row at the base and about 5 very small ones on the distal half, without hairs, as in the oviparous female. Abdomen short, with a few hairs on the dorsum, without tubercles. Cornicles very short, much wider than long, as in the female. Cauda almost as in the winged viviparous female, with about 3 lateral pairs of rather fine hairs.

Anal plate not sinuated. Claspers hairy. Legs slender, with some moderate or rather long hairs on the tibiae; tarsi not imbricated, with a few minute spinules; hind tarsi shorter than the base of the last antennal joint. Basal part of penis chitinized.

Length of body-about 1.4 mm. Antenna-about 1.4 mm.

Fore wing-about 2.0 mm.

The male differs from the winged oviparous female in the following characters:

(1) Body shorter, with the abdomen smaller.

(2) Head comparatively large.

(3) Antennae longer; the 3rd joint stouter, shorter than the 4th, 5th and 6th taken together. (In the oviparous female the 3rd joint slender, almost as long as the 4th, 5th and 6th taken together).

(4) Hind tarsi shorter than the base of the last antennal joint. (In the oviparous female hind tarsi almost as long as the base of the last antennal joint).

(5) Antennal sensoria transversely narrowed or oval, short, not encircling the joints, present on the 3rd and succeeding joints. (In the oviparous female, the sensoria encircle the joint and are present only on the 3rd joint, as in the winged viviparous female).

(6) Cauda in shape almost as in the viviparous female, not globular, and much smaller.

(7) Anal plate not sinuated. (In the oviparous female the anal plate almost bilobed, as in the winged viviparous female).

(8) Hind tibiae not dilated, without sensoria.

(9) A pair of claspers present.

Winged oviparous female

Almost as in the winged viviparous female, differing from it, however, in the following characters:

(1) Cauda very large, almost globular, scarcely constricted at the base, black, covered with white secretions, with a few short hairs on the dorsal surface.

(2) Hind tibiae moderately dilated on the basal half, provided with many circular or oval sensoria that are mostly of medium size. (In the winged viviparous female the hind tibiae slender, provided with 0-5 circular sensoria on the basal half).

Length of body-about 1.8 mm. Antenna-about 1.15 mm.

Fore wing-about 2.5 mm.

During copulation the oviparous female, upon the dorsum of which the male climbs, usually holds her wings spread out. However, when copulation takes place soon after the last moult of the female, as is sometimes the case, her wings are carried on the back, being not yet dried out, and are trod upon and broken by the male. These females with broken wings are not able to fly.

Many sexual forms were collected by the author in June, 1923, at Meguro and Ikegami, near Tokyo.

Patchia spiraeae n. sp.

(Pl. X, A, figs. 1-2)

Wingless viviparous female.

Body not elongated, provided with many very long stout bristles each arising from a very small tubercle. Head very short, wide, the dorsal surface provided with about 10 very long stout bristles. Eyes very small, with distinctly protuberant ocular tubercles. Frontal tubercles lacking. Antennae much shorter than the body, rather stout, 6-jointed, each joint furnished with a few very long stout bristles which are shorter than those on the body; the 1st joint larger than the 2nd, provided with 3or 4 long bristles; the 3rd not imbricated, without sensoria, moderately narrowed toward the base, stouter than the front tibia, almost as long as the bristle on the body, with about 5 very long bristles and a few shorter ones mostly on the distal half; the 4th almost as long as the 5th; the 5th with a large circular apical sensorium which is surrounded by a row of short hairs; the 6th with a similar sensorium; the elative length of joints about as follows: III-45, IV 21, V-22, VI-33 (15+18). Rostrum rather slender, reaching the middle coxae. Body without prominent tubercles. Cornicles distinctly expanded toward the base, constricted on the distal portion, wider than long, not reticulated, almost as long as the basal part of the 6th antennal joint, much shorter than the bristle on the body. Anal plate moderately bilobed, provided with one or more pairs of long bristles.

Cauda longer than wide, narrowed on the distal half, not constricted at the base, with a pair of very long bristles. Legs rather slender; tibiae with many rather long bristles; tarsi normal, longer than the base of the last antennal joint.

Length of body-about 2.0 mm. Antenna-about 0.7 mm.

Host.-*Spiraea cantoniensis* (Rosaceae).

Distribution.-Japan: Tadono in Wakayama-prefecture.

A few wingless forms were collected by Mr. M. Kurisaki on May 4,1920.

This aphis is the second species of the genus *Patchia*, which is new to japan.

Pterochlorus roboris (L.)

Lachnus roboris, Kaltenbach, Monog. Pflanzenl. p. 148 (1843).

Aphis roboris, Walker, Ann. Mag. Nat. Hist. 2nd series, II, p. 106 (1848).

Dryobius roboris, Koch, Pflanzenl. p. 226 (1857); Buckton, Monog. Br. Aphid. III, p. 71 (1880).

Dryobius croaticus, Koch, Pflanzenl. p. 228 (1957); Buckton, Monog. Br. Aphid. III, p. 74 (1880).

Pterochlorus roboris, van der Goot, Beitr. Kenntnis Holand. Blattl. p. 414 (1915); Baker, U. S. Dept. Agr. Bull. 826, pl. II, S-U (1920); Swain, Entom. News, xxxii, p. 211 (1921).

Host.-*Quercus dentata.*

Distribution.-Japan: Oi in Gifu-prefecture, Tokyo.

Europe.

Hitherto unrecorded from Japan.

The Japanese specimens differ somewhat from the description of van der Goot in the following characters:

(1) All the legs of the viviparous female are black, with the tips and bases of the femora brownish.

(2) The 6th antennal joint of the viviparous female is shorter; the relative length of the antennal joints is about as follows: in the wingless form-III-188, IV-77, V-74, VI 35; in the winged form-III-173, IV-80, V-76, VI-35.

The wingless viviparous female is provided with a small tubercle at the middle of the dorsum of the abdomen.

Lachnus laricis (Walker)

Aphis laricis, Walker, Ann. Mag. Nat. Hist. 2nd series, vol. II, p. 102 (1848).

Lachnus laricis, Mordvilko, Horae Ent. Soc. Rossicae, XXXI, p. 666 (1898).

Lachnus laricus, van der Goot, Beitrage Kenntnis Holand. Blattl. p. 399 (1915).

syn. *Lachnus laricicolus*, Matsumura, Jl. Coll. Agr. Sapporo, VII, pt. 6, p. 380 (1917).

Host.-*Larix sp.*

Distribution.-Japan: Sapporo, Abashiri, Monbetsu.

Europe.

Some viviparous females, both winged and wingless, were collected by Mr. T. Esaki at Abashiri, Hokkaido, on August 30, 1922. Some oviparous females and a male were collected by Prof. Niijima at Monbetsu, Hokkaido, on November 27, 1923.

Stomaphis yanonis Takah.

Dobutsugaku Zasshi (Zool. Mag.), Tokyo, no. 359, p, 369 (1918); Proc. Ent. Soc. Washington, xxi, no. 7, p. 176 (1919) and Aphididae of Formosa-2, p. 139 (1923); Honda. Biol. Bull. XL, p. 350 (1921).

Host.-*Celtis sinensis*.

Distribution.-Japan: Tokyo.

In the wingless viviparous females collected on June 15, 1923, at Meguro, Tokyo, by the author, the following two forms were represented: (1) Body about 5mm. in length; the 3rd antennal joint provided with 0-2 sensoria on the distal part, the 4th with from 2-8 circular sensoria of various sizes arranged in a row over the whole length. (2) Body about 4mm. in length; the 3rd antennal joint provided with from 11-14 circular sensoria of various sizes in a row over the whole length; the 4th with 5-7 similar sensoria. The latter form is apterous, but the 3rd antennal joint is provided with more than 10 sensoria and the body is shorter, as in the winged viviparous female. In the author's opinion this is an intermediate.

Oregma japonica n. sp.

(Pl. V, B, figs. 1-2)

Wingless viviparous female.

Almost black; head and thorax somewhat brownish. Eyes black. Antennae and legs brownish black. Body rather flat, very wide, covered with wax. Head fused with the prothorax, provided with many long bristles which are almost as long as the first antennal joint. Hornlets short, much shorter than the 2nd antennal joint, rather sharply pointed. Antennae 4-jointed, provided with a few bristles; the 3rd joint with the apical sensorium very small; the 4th somewhat imbricated on the distal part; the relative length of joints as follows: III-23, IV-22. Rostrum stout, not reaching the middle coxae. Abdomen nearly circular, provided with some moderately long bristles. Cornicles large, much wider than long. Cauda much wider than long, constricted at the base provided with some bristles. Anal plate divided into two lobes. Legs provided with many long fine hairs; hind tarsi longer than the 3rd antennal joint.

Head on the dorsal surface between the eyes provided with two pairs of groups

of very small, circular wax-pores; the number of these wax-pores: front group-3 or 4; hind group-5.....7. Pronotum with a pair of groups of wax-pores which are rather irregular in shape, not distinct, and numbering about 22 in each group, on the dorsum between the lateral wax-pores. Each thoracic and the first 7 abdominal segments, on the sides, with a group of wax-pores which are large and circular; the number of these wax-pores in a group being as follows: pronotum-7.....8, mesonotum-8, metanotum-6.....7; the 1st abdominal segment-4.....6, the 2nd abd.-6, the 3rd abd.-6.....9, the 4th abd.-7.....9, the 5th abd.-5.....6, the 6th abd.-7.....8, the 7th abd.-11.....12; the 8th abdominal segment with 15.....16 wax-pores in a group at the middle of the dorsum.

Length of body-about 1.7 mm. Antenna-about. 0.25 mm.

Host.-*Bambusa sp.*, attacking the leaf.

Distribution.-Japan: Oita-prefecture (Hayamigun); Tokyo.

Some wingless viviparous females were collected by Mr. K. Uye on Jan. 1, 1923.

Many wingless viviparous females and their nymphs were collected by the author in June, 1923, at Tokyo.

In the specimens from Tokyo the hornlets on the head are almost as long as the 2nd antennal joint, and the antennae are somewhat longer and sometimes 5-jointed, though the 3rd and 4th joints are not well defined with the relative length of joints about as follows: III-33, IV-25.

This aphis is very inactive and groups very densely like most other species of the genus *Oregma*.

Astegopteryx distyfoliae Takah.

Nipponaphis distyfoliae, Takahashi, Bull. Brooklyn Entom. Soc., xv, 4, p. 115 and Dobutsugaku Zasshi, xxxii, p. 195 (1920).

Astegopteryx distyfoliae, Takahashi, Aphididae of Formosa-2, p. 148 (1923).

Nipponaphis distylii, Essig and Kuwana (in part), Proc. Calif. Acad. Sc., viii, 3, p. 109 (1918).

Winged viviparous female

(Second generation)

Head, eyes, antennae, mesothorax and legs almost black. Abdomen brownish yellow. Wings pale dusky, veins pale gray to pale brownish. Body oblong. Head small, with a few very short hairs. Eyes large, with the ocular tubercles very small. Frontal tubercles lacking. Antennae short, stout, 5-jointed; the 1st and 2nd joints

subequal in length; the 3rd provided with about 13 or 14 encircling sensoria; the 4th and 5th each with about 6 or 7 similar sensoria; the 5th furnished with a few hairs at the apex; the relative length of joints about as follows: III-40, IV-18, V-18. Rostrum not reaching the middle coxae. Thorax large. Fore wings very wide, stigma large; subcosta with about 5 minute sensoria at the base and about 5 very small ones about the middle; the 1st oblique stouter than the remaining veins; the 1st and 2nd obliques united at their bases; the 3rd obsolete at the base, once branched; stigmatic vein reaching the apex of the wing; hind wings with 2 divergent obliques; hooklets 2. Spiracles somewhat protuberant. Abdomen without hairs. Cornicles small, represented almost as pores. Cauda much wider than long, rounded, not constricted at the base. Anal plate moderately bilobed.

Legs moderately long, slender; tibiae and tarsi somewhat imbricated, with a few setae; hind tarsi almost as long as the 5th antennal joint, provided with 4 very long capitate hairs.

Length of body-about 1.3 mm. Antenna-about 0.40 mm.

Fore wing-about 2.1 mm.

There are some errors in the original description that have been corrected above.

Food plant catalogue of the Formosan Aphididae

(Supplement)

Ageratum conyzoides L. (Compositae).
- Anuraphis helichrysi Kalt.

Anona sp. (Anonaceae)
- Toxoptera aurantii Boyer.

Artemisia capillaris Thunb. (Compositae).
- Anuraphis artemisiae Takah.
- Cryptosiphum artemisiae Buckt.

Artemisia vulgaris L. var. indica Max.
- Macrosiphum species.

Arundinaria sp. (Gramineae).
- Myzocallis formosanus Takah.
- Myzocallis sp.

Bambusa sp. (Gramineae)
- Oregma koshunensis Takah.
- O. pseudomontana Takah.

Bidens pilosa L. (Compositae)
- Anuraphis helichrysi Kalt.

Blumea balsamifera L. (Compositae).
- Aphis sp.
- Macrosiphum gobonis Mats.

Breynia officinalis Hemsl. (Euphorbiaceae)
- Aphis gossypii Glov.

Castanopsis subacuminata Hay. (Cupuliferae)
- Eutrichosiphum lithocarpi Maki.
- Greenidea tenuicorpus Okaj.

Chenopodium album L. (Chenopodiaceae)
- Hyalopterus chenopodii Schrank.

Chrysanthemum coronarium L. (Compositae).
- Macrosiphum gobonis Mats.

Chrysanthemum sinensis Sab.
- Rhopalosiphum lahorensis Das.

Cirsium japonicum De. (Compositae).
Capitophorus braggii Gillette.
C. sp.
Clematis fouriana Roxb. (Ranunculaceae)
Eriosoma clematicola Takah.
Clematis sp.
Macrosiphum sp.
Myzus varians Davidson.
Cocos sp. (Palmae)
Cerataphis formosanus Takah.
Coriandrum sativum L. (Umbelliferae)
Brachycolus heraclei Takah.
Daucus carota L. (Umbelliferae)
Brachycolus heraclei Takah.
Dendrocalamus latiflorus Munro. (Gramineae)
Oregma alexanderi Takah.
O. formosana Takah.
Ehretia buxifolia Roxb. (Boragineae)
Toxoptera aurantii Boyer.
Elephantopus mollis H. B. K. (Compositae).
Aphis gossypii Glov.
Emilia sonchifoliae De. (Compositae)
Aphis malvoides V. d. Goot.
Eriobotrya deflax (Rosaceae).
Aphis gossypii Glov.
Fagara cuspidata Champ. (Rutaceae)
Aphis sp.
Gramineae, a plant of.
Macrosiphum sp.
Lactuca debilis Benth. et Hook. (Compositae).
Macrosiphum sp.
Leonurus sibiricus L. (Labiatae).
Aphis gossypii Glov. (syn. Toxoptera leonuri Takah.)
Lindera glauca Bl. var. kawakamii Hay. (Laurineae)
Aiceona actinodaphnii Takah.

Nerium odorum Soland. (Apocynaceae)
Myzus persicae Sulz.
Oplismenus compositus Beauv. (Gramineae)
Oregma oplismeni Takah.
Ouroparia formosana Hay. (Rubiaceae)
Aphis sp.
Perilla ocymoides L. (Labiatae)
Macrosiphum perillae Takah.
Petasites tricholobus Fr. (Compositae)
Aphis petasiticola Takah.
Pinus sp.
Dilachnus formosanus Takah.
Unilachnus orientalis Takah.
Plantago major L. (Plantagineae)
Myzus plantagineus Pass?
Pollinia ciliata Trin. (Gramineae)
Paracletus cynodonti Das.
Polygonum multiflorum Thunb. (Polygonaceae)
Myzus persicae Sulz.
Prunus transarisanensis Hay. (Rosaceae)
Myzus sp.
Salvinia natans. (Salviniaceae)
Rhopalosiphum nymphaeae L.
Setaria glauca Beauv. (Gramineae)
Macrosiphum granarium Kirby.
Smilax stenopetala A. Gr. (Liliaceae).
Macrosiphum smilacicola Takah.
Tectona grandis L. (Verbenaceae)
Aphis malvae Koch.
Thea japonica Thunb. (Ternstroemiaceae)
Macrosiphum citricola v. d. Goot.
(Host unknown)
Aiceona osugii Takah.
Amphorophora sp.

Explanation of Plates.

Plate I.

A

Macrosiphum sp. (on *Clematis sp.*)

(Wingless viviparous female)

Fig. 1.....Cornicle.

Fig. 2.....Head.

Fig. 3.....Cauda (dorsal view)

Fig. 4.....Cauda (lateral view)

B

Macrosiphum smilacifoliae Takah.

(Wingless viviparous female)

Fig. 1.....Cornicle

Fig. 2.....Cauda

Figs. 3-4.....Base of the 3rd antennal joint.

Macrosiphum granarium Kirby. (on *Miscanthus sp.*)

(Wingless viviparous female)

Fig. 5.....Cauda

Myzus varians Davidson?

(Wingless viviparous female)

Eig. 6.....Head

Fig. 7.....Cornicle.

Plate II.

A

Macrosiphum alopecuri Takah.

(Winged viviparous female)

Fig. 1.....Head.

(Wingless viviparous female)

Fig. 2.....Cauda.

Fig. 3.....Cornicle.

Fig. 4.....Base of the 3rd antennal joint.

Fig. 5.....Cornicle of full-grown nymph.

Amphorophora viciae (Kalt.)

(Winged viviparous female)

(Collected at Tokyo)

Fig. 6.....Cornicle.

Fig. 7 .....Cauda.

B

Aphis sp. (on *Salix sp.*)

(Wingless viviparous female)

Fig. 1.....Hind tarsi.

Fig. 2.....Cornicle.

Fig. 3.....Head.

Fig. 4.....Cauda.

Macrosiphum sp. (on *Artemisia vulgare* var. *indica*)

(Wingless viviparous female)

Fig 5.....Cauda.

Macrosiphum tanacetarium Kalt.

(Wingless viviparous female)

Fig. 6.....Cauda.

Figs. 7-8.....Cornicle.

Fig. 9.....Cauda of full-grown nymph (hairs removed)

Fig. 10.....Cornicle of full-grown nymph.

Plate III.

A

Callipterus kahawaluokalani Kirk.

Figs. 1-4.....Eggs.

Shivaphis celti Das.

Fig. 5.....Ovum (taken out of the body)

Capitophorus braggi Gillette.

(Wingless viviparous female)

Fig. 6.....Cornicle.

B

Greenidea formosana Maki.

(Nymph of viviparous female)

Fig. 1.....Hind part of abdomen of the 1st instar.

Fig. 2.....Cornicle of the 1st instar.

Fig. 3.....Cornicle of the 2nd instar.

Fig. 4.....Hair.

Fig. 5.....Cauda and anal plate of the 4th instar.

Neophyllaphis podocarpi Takah.

(Nymph of wingless viviparous female)

Fig. 6.....Cauda of the 1st instar.

Fig. 7.....Cauda of the 3rd instar.

Fig. 8.....Cornicle of the 4th instar.

Fig. 9.....Anal plate of adult.

Plate IV.

A

Macrosiphum sp. (on *Artemisia vulgare* var. *indica*)

(Wingless viviparous female)

Fig. 1.....Cornicle.

Brachysiphoniella gramini Takah.

(Full-grown nymph of winged viviparous female)

Fig. 2.....Cornicle.

Fig. 3.....Cauda.

Fig. 4.....Head

Fig. 5.....Cauda of adult (lateral view)

Astegopteryx quercicola Takah.

(Nymph of wingless viviparous female)

Fig. 6.....The 1st instar (antennae and legs removed)

Fig. 7.....Antenna of the 1st instar.

Fig. 8.....Antenna of grown nymph.

(Nymph of winged viviparous female)

Fig. 9.....Antennn of the 1st instar.

Fig. 10.....Antenna of the 2nd instar.

Fig. 11.....Antenna of the 3rd instar.

B

Astegopteryx quercicola Takah.

(Wingless viviparous female)

Fig. 1.....Adult (dorsal view)
Fig. 2.....Anal plate.
Fig. 3.....Wax protruding from the margin of body (the 1st instar)

Astegopteryx fici Takah.

Fig. 4.....Antenna of nymph of the 1st instar.

Amuraphis artemisiae n. sp.

(Winged viviparous female)
Fig. 5.....Cornicle.
Fig. 6.....Cauda.

(Wingless viviparous female)
Fig. 7.....Cornicle
Fig.s 8-9.....Cauda

Aphis petasiticola n. sp.

(Wingless viviparous female)
Fig. 10.....Head.

Plate V.

A

Shivaphis celti Das.

Fig. 1.....Head of male.

Macrosiphum sp. (on a plant of the *Gramineae*)

(Wingless viviparous female)
Fig. 2.....Cornicle.
Fig. 3.....Cauda.

Macrosiphum alopecuri Takah.

(Winged viviparous female)
Fig. 4.....Cauda.
Fig. 5.....Cornicle.

Astegopteryx quercicola Takah.

(Nymph of winged viviparous female)
Fig. 6.....Antenna of full-grown nymph.
Fig. 7.....Wax-pores on the head of full-grown nymph.

B

Oregma japonica n. sp.

(Wingless viviparous female)
Fig. 1.....Head and pronotum.
Fig. 2.....Cauda.

Astegopteryx fici Takah.

Fig. 3.....Nymph of wingless viviparous female (The 1st instar)

(Nymph of winged viviparous female)
Fig. 4.....Antenna (the 4th instar)
Fig. 5.....Cornicle („)
Fig. 6.....Tubercle on the dorsum(„)
Fig. 7.....Cauda („)

Plate VI.

A

Astegopteryx styracicola Takah.

Fig. 1.....Galls.
Fig. 2.....A branchlet in the gall.

Myzus varians Davidson?

Fig. 3.....Head of winged viviparous female.

Capitophorus braggii Gillette.

(Wingless viviparous female)
Fig. 4.....Cauda.
Fig. 5.....Head.

B

Hyalopterus chenopodii (Schrank).

(Wingless viviparous female)
Fig. 1.....Cauda
Figs. 2-3.....Cornicle.
Fig. 4.....Hind tarsi.

(Winged viviparous female)
Fig. 5.....Cornicle.

(Full-grown nymph of winged viviparous female)
Fig. 6.....Cauda.
Fig. 7.....Cornicle.

(Winged male)

Fig. 8.....Cornicle.

Rhopalosiphum lahorensis (Das). (on *Chrysanthemum sp.*)

(Wingless viviparous female)

Fig. 9.....Cauda.

Fig. 10.....Cornicle.

Fig. 11.....Head.

Fig. 12.....Anal plate.

Fig. 13.....Hair on the abdomen.

Oregma pseudomontana n. sp.

(Wingless viviparous female)

Fig. 14.....Head.

Plate VII.

A

Oregma pseudomontana n. sp.

(Wingless viviparous female)

Fig. 1.....Head (left half).

Myzus tropicalis Takah.

(Wingless viviparous female)

Fig. 2.....Cauda.

(Winged viviparous female)

Fig. 3.....Cauda.

Fig. 4.....Cornicle.

(Nymph of wingless form)

Fig. 5.....Head of the 3rd instar.

Cavariella neocapreae Takah.

(Nymph of viviparous female)

Fig. 6.....Cornicle of the 1st instar.

Fig. 7.....Antenna of the 1st instar.

Fig. 8.....Cornicle of the 4th instar (Winged form).

Fig. 9.....Cauda of the same.

(Wingless viviparous female).

Fig. 10.....Cauda (hairs removed).

B

Cavariella neocapreae Takah.

(Wingless viviparous female)

Fig. 1.....Horn above the cauda.

Fig. 2.....Cornicle.

Trichosiphonaphis polygoniformosanus Takah.

Fig. 3.....Head of young nymph.

Fig. 4.....Cornicle of nymph.

Fig. 5.....Cauda of full-grown nymph of wingless viviparous female (hairs removed).

Fig. 6.....Head of the same.

Fig. 7.....Head of full-grown nymph of winged viviparous female.

Rhopalosiphum pseudobrassicae (Davis).

(Winged viviparous female)

Fig. 8.....Cauda of full-grown nymph.

Fig. 9.....Cornicle of the same.

Fig. 10.....Cornicle of adult.

Fig. 11.....Cauda of adult.

Plate VIII.

A

Trichosiphonaphis polygoniformosanus Takah.

Fig. 1.....Cauda of full-grown nymph of winged viviparous female.

Oregma bambusifoliae Takah.

(Nymph of viviparous female)

Fig. 2.....Horns on the head of the 1st instar.

Fig. 3.....Horns of the 2nd instar.

Fig. 4.....Horns of the 3rd instar (winged form).

Fig. 5.....Horns of the 4th instar (winged form).

Fig. 6.....Abdominal apex of the same.

Fig. 7.....Cornicle of the same (hairs removed).

(Wingless viviparous female)

Fig. 8.....Head.

Neophorodon rubi Takah.

(Wingless viviparous female)

Fig. 9.....Head (hairs removed).

Fig. 10.....Tubercle on the 2nd antennal joint.

(Full-grown nymph of winged form)

Fig. 11.....Basal part of antenna.

B

Macrosiphum perillae n. sp.

(Wingless viviparous female)

Fig. 1.....Cauda.

Fig. 4.....Trochanter and basal part of femur.

Fig. 5.....Cornicle.

(Winged viviparous female)

Fig. 2.....Head.

Fig. 3.....Cornicle.

Cervaphis quercus Takah.

(Winged viviparous female)

Fig. 6.....Head.

Fig. 7.....Cornicle.

Fig. 8.....Horn on the head.

Plate IX.

A

Neophyllaphis podocarpi Takah.

(Winged male)

Fig. 1.....Sensoria on the 3rd antennal joint.

(Winged viviparous female)

Fig. 2.....Sensoria on the 3rd antennal joint.

Fig. 3.....Sensoria on the hind tibia.

Fig. 4.....Anal plate.

Fig. 5.....Cauda.

Fig. 6.....Fore wing.

(Winged oviparous female)

Fig. 7.....Cauda (lateral view)

Fig. 8.....Cauda (dorsal view)

Myzus? polygoni (v. d. Goot).

(Wingless viviparous female)

Fig. 9.....Head.

B

Myzus? polygoni (v. d. Goot)

(Wingless viviparous female)

Fig. 1.....Cornicle.

Fig. 2.....Cauda.

Amphorophora taiwanum Takah.

(Wingless viviparous female)

Figs. 3-4.....Cornicle.

Macrosiphum esakii n. sp.

(Wingless viviparous female)

Fig. 5.....Head.

Fig. 6.....Cornicle.

Fig. 7.....3rd antennal joint.

Plate X.

A

Patchia spiraeae n. sp.

(Wingless viviparous female)

Fig. 1.....Cornicle

Fig. 2.....Bristle on the body

Myzocallis formosanus n. sp.

(Winged viviparous female)

Fig. 3.....Head.

Macrosiphum smilacicola n. sp.

Fig. 4.....Sensoria on tibia.

Fig. 5.....Sensoria on femur.

Eriosoma clematicola n. sp.

Fig. 6.....Wax-pores on the body of wingless female.

Kurisakia juglandicola Takah.

Fig. 7.....Fore wing of viviparous female

Fig. 8.....Hind wing.

Aiceona osugii n. sp.

(Wingless viviparous female)

Fig. 9.....Cauda (hairs removed)

Fig. 11.....Eyes.

Fig. 10.....Fore wing of viviparous female

B

Aiceona osugii n. sp.

Fig. 1.....Cornicle of wingless viviparous female.

Aiceona actinodaphnii Takah.

Fig. 2.....Cornicle of winged viviparous female.

Cerataphis formosanus n. sp.

Fig. 3.....Horns on the head of wingless viviparous female.

Oregma alexanderi n. sp.

(Wingless viviparous female)

Fig. 4.....Cornicle

Fig. 5.....Anal plate

Fig. 12.....Head

Oregma oplismeni n. sp.

(Wingless viviparous female)

Fig. 6.....Cornicle

Fig. 7.....Head

Oregma koshunensis n. sp.

Fig. 8.....Cornicle of wingless viviparous female

Oregma formosana n. sp.

(Wingless viviparous female)

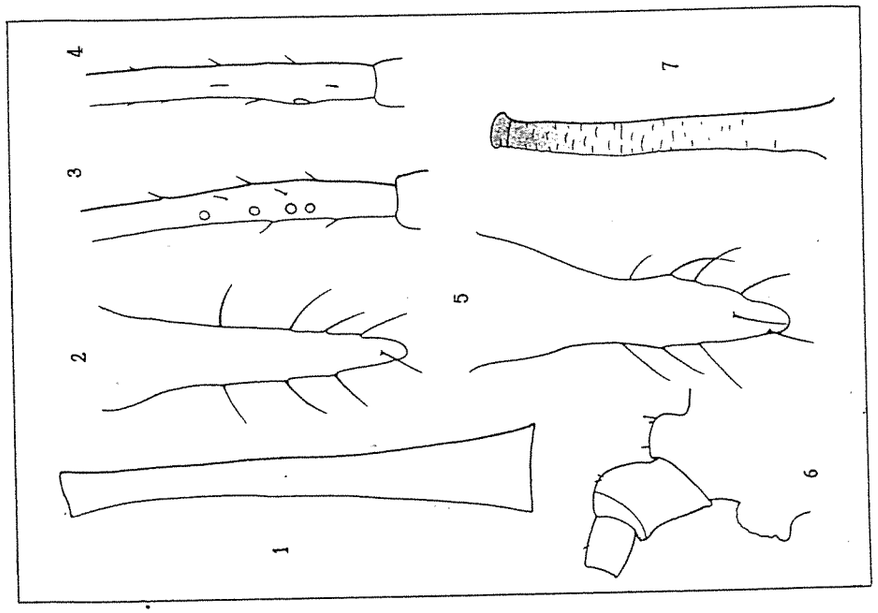
Fig. 9.....Head

Fig. 10.....Cornicle

Oregma orientalis Takah.

Fig. 11.....Horns on the head of wingless viviparous female.

(B)



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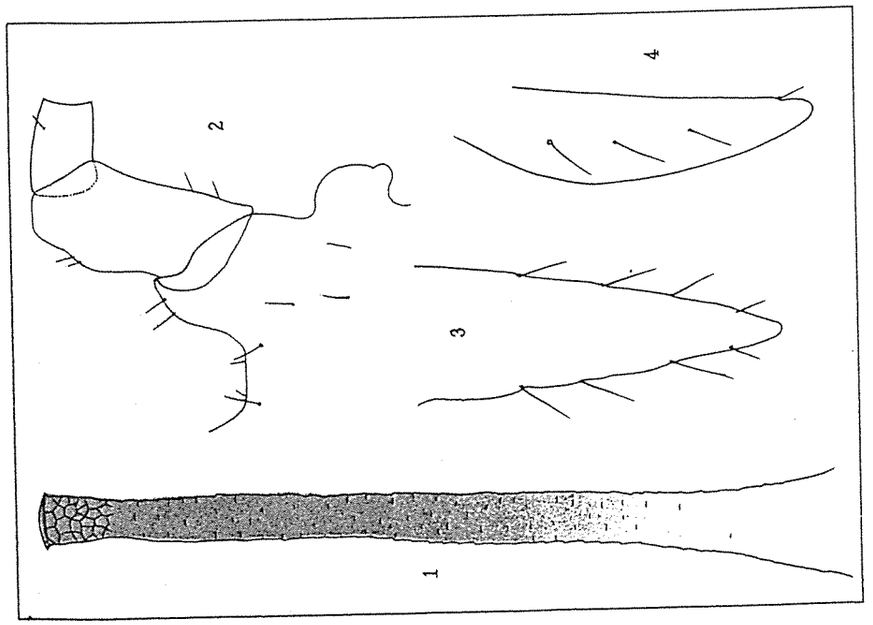

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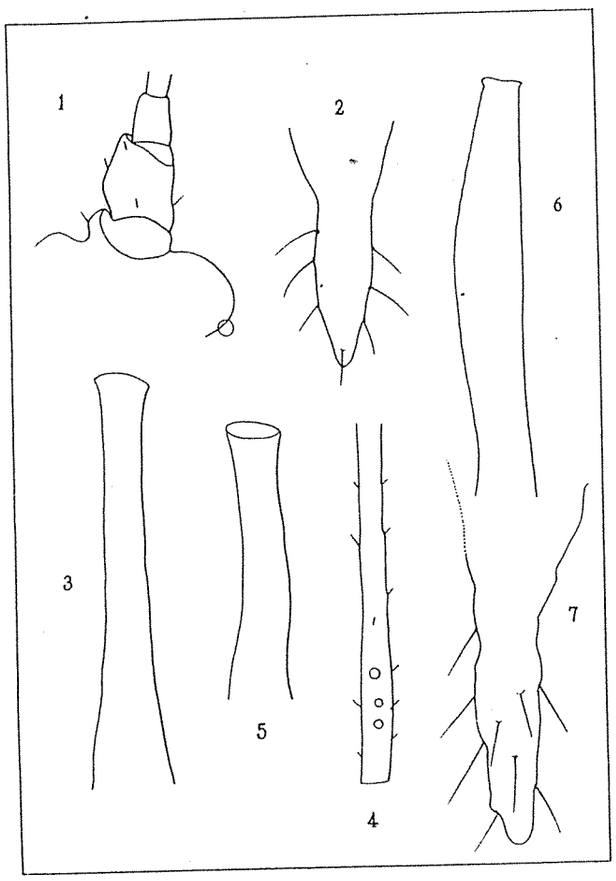

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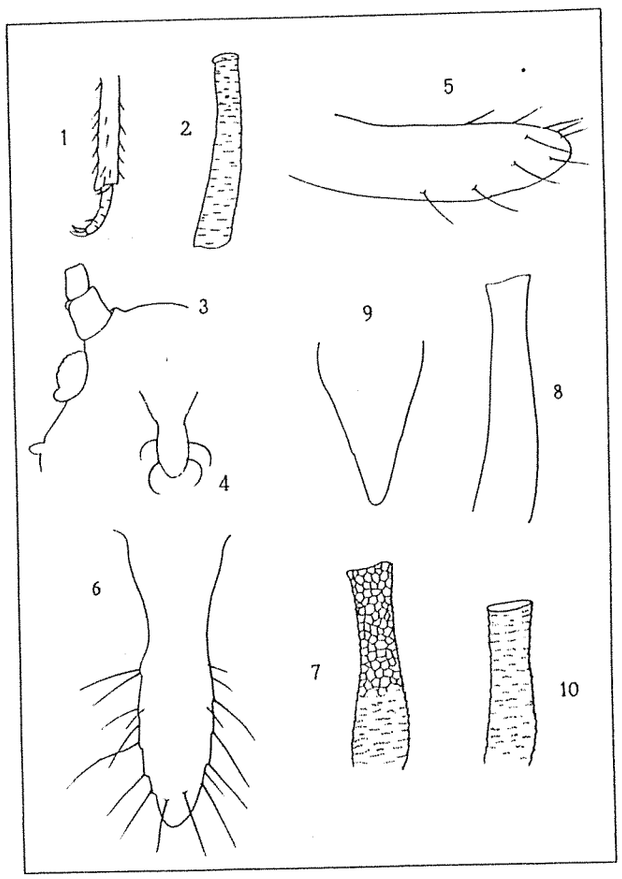

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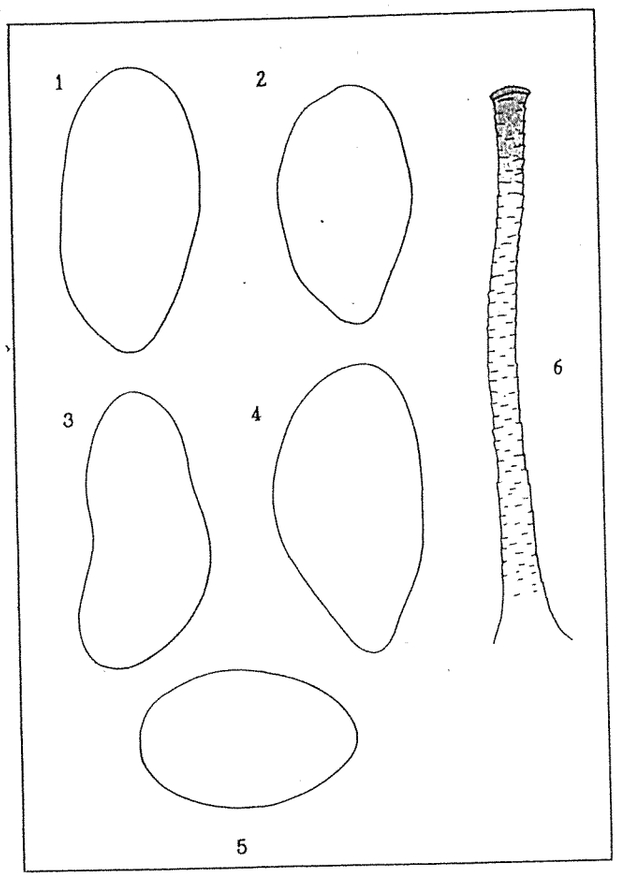

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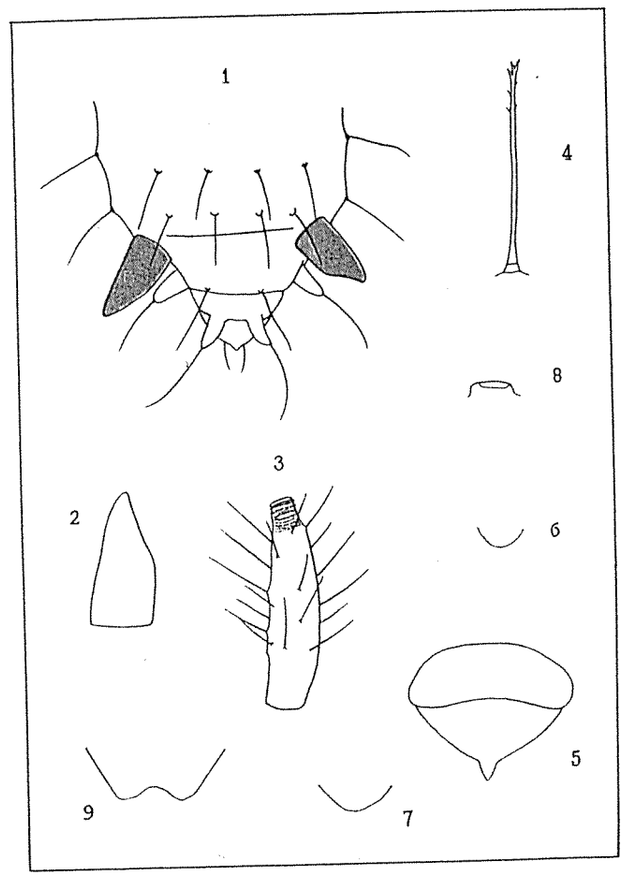

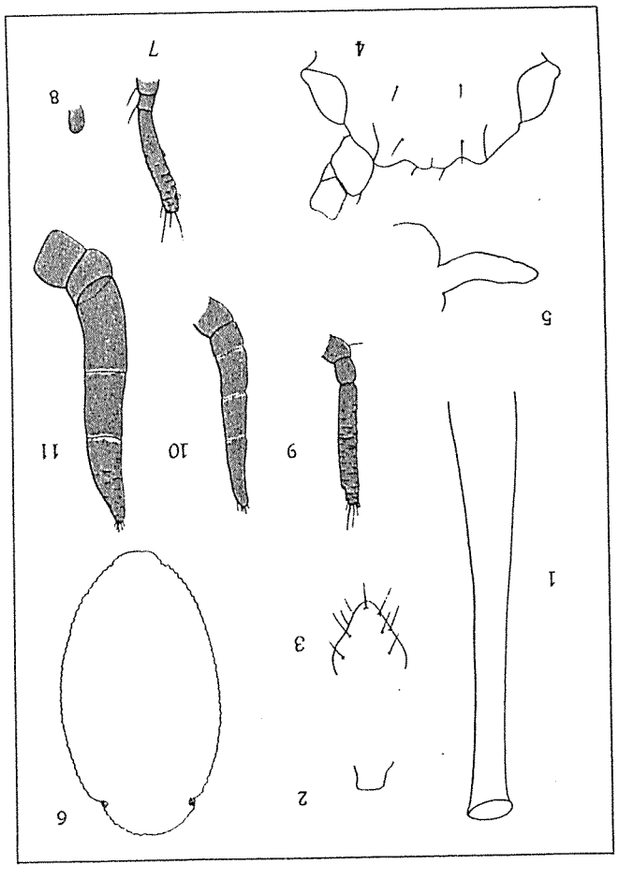

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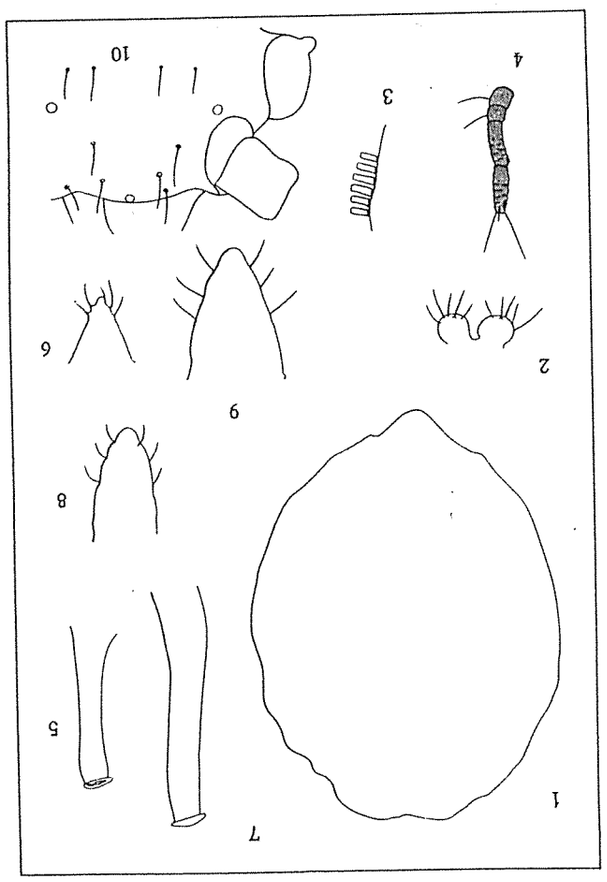

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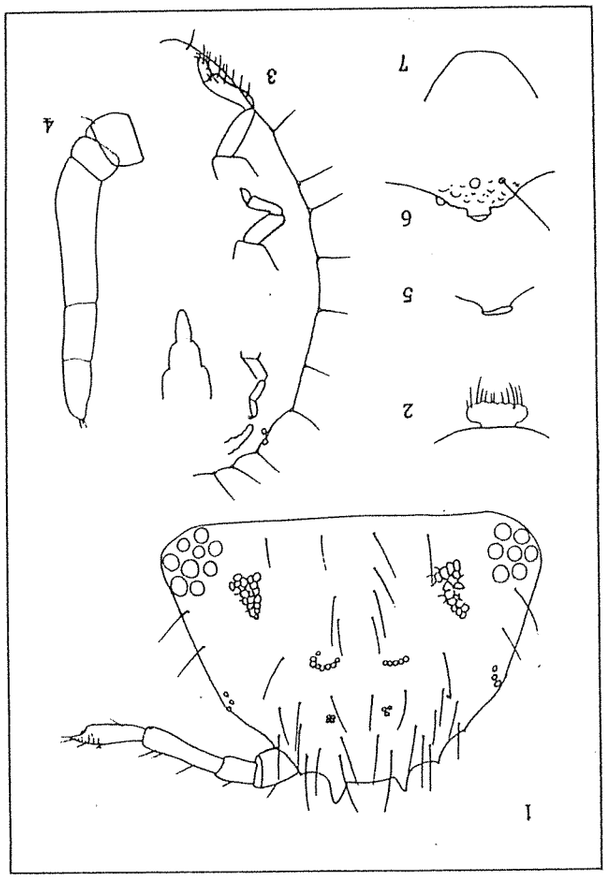

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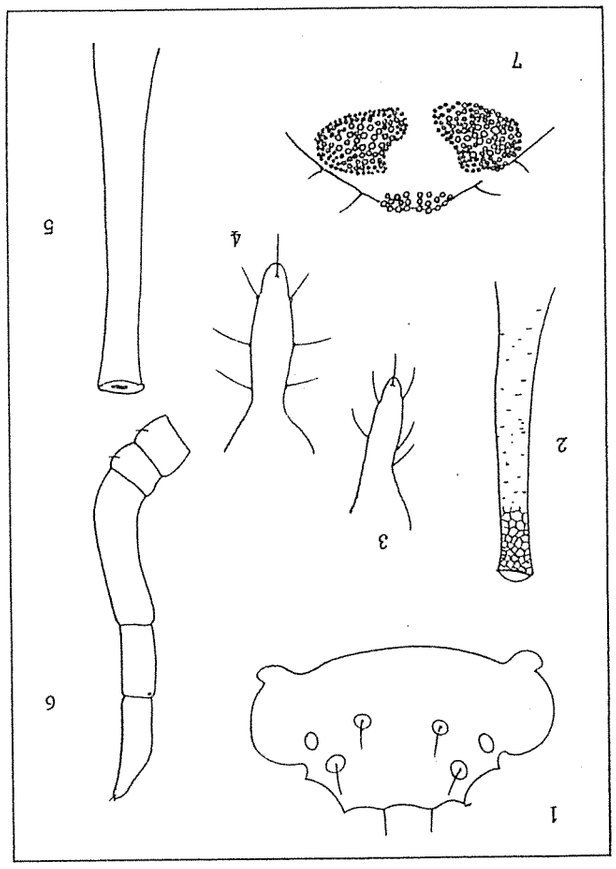

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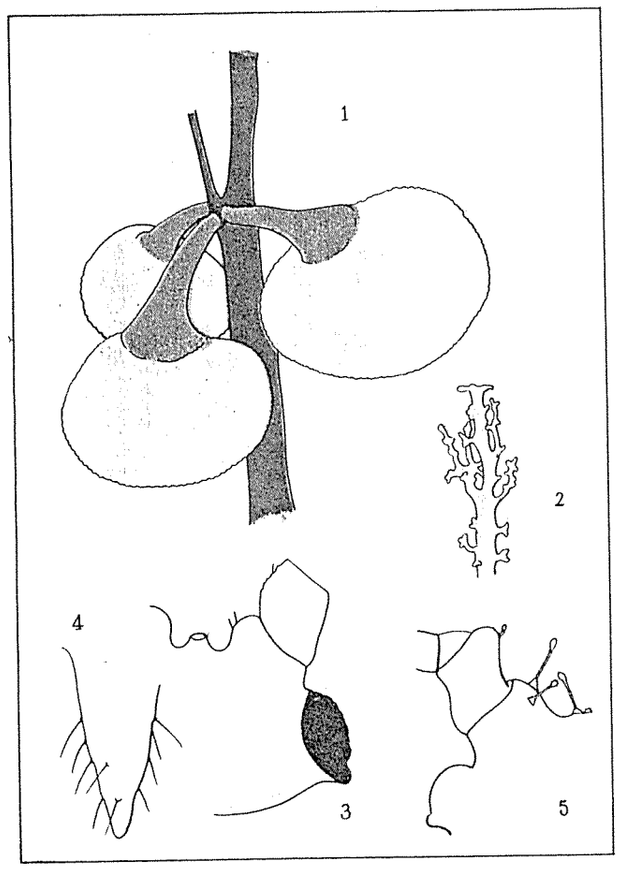

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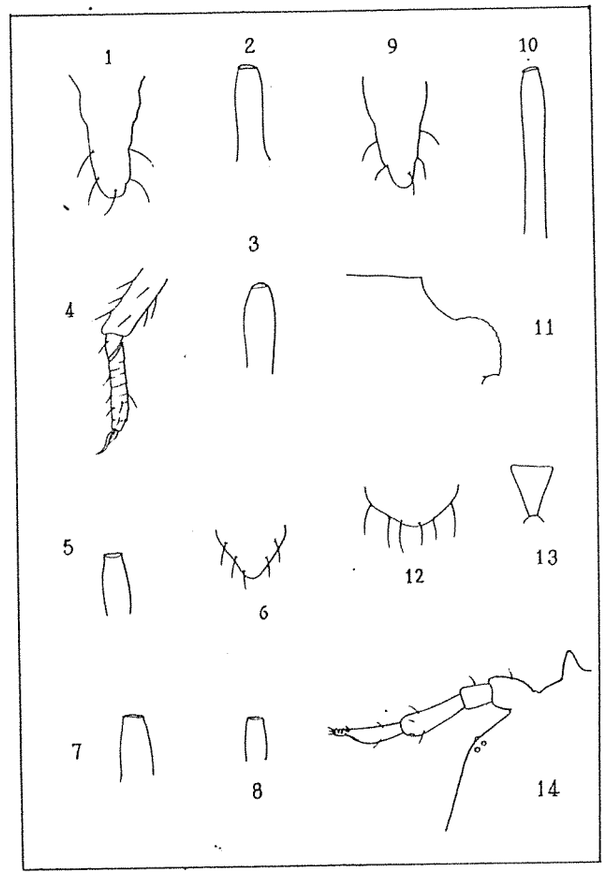

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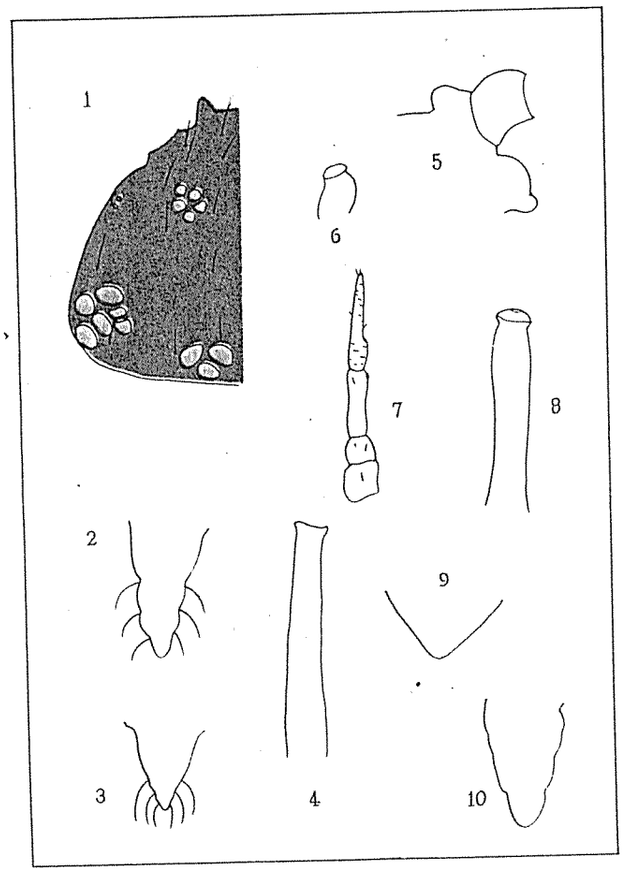

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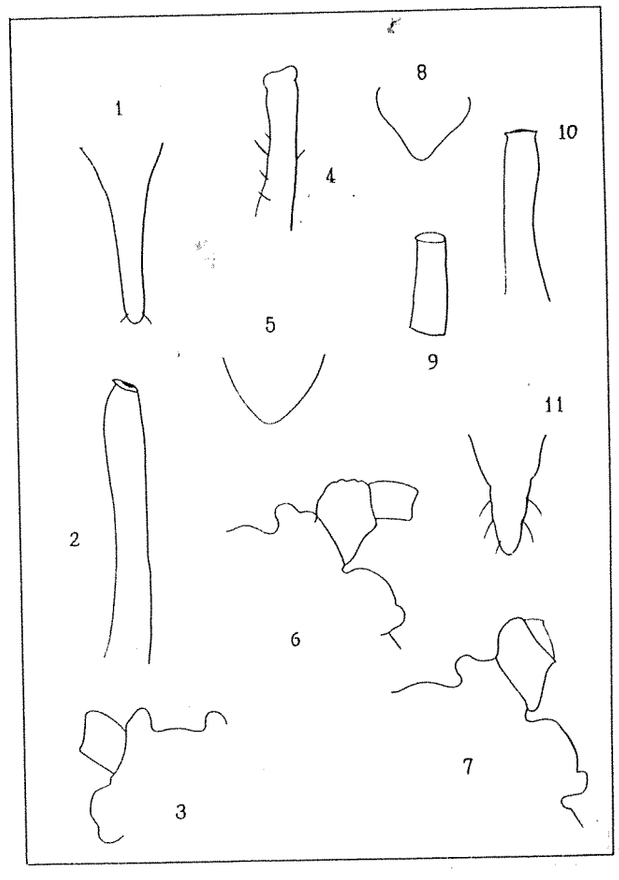

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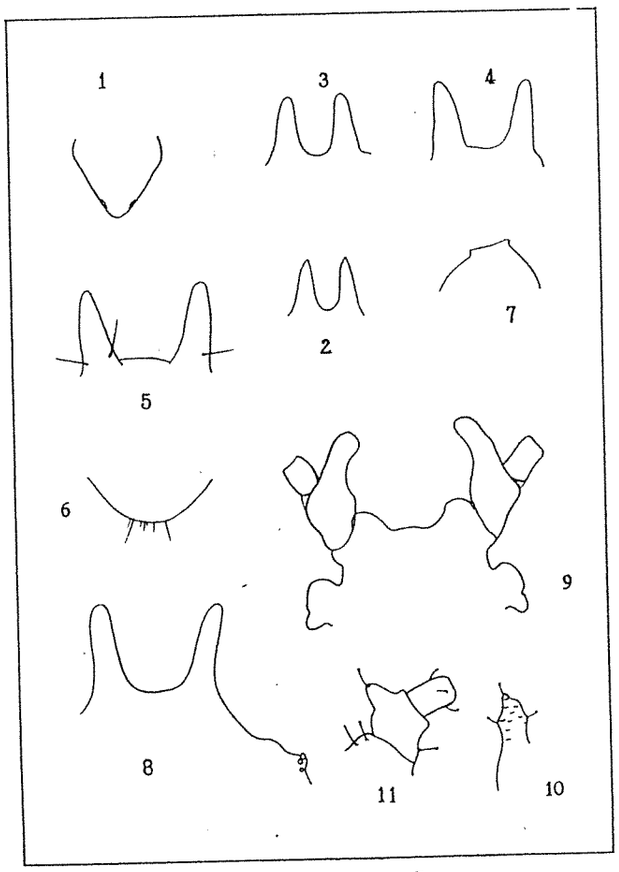

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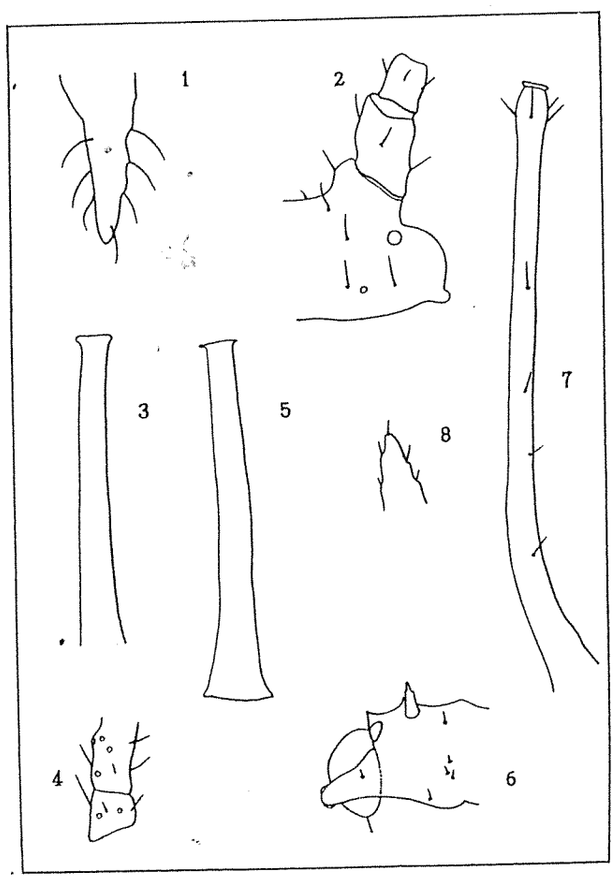

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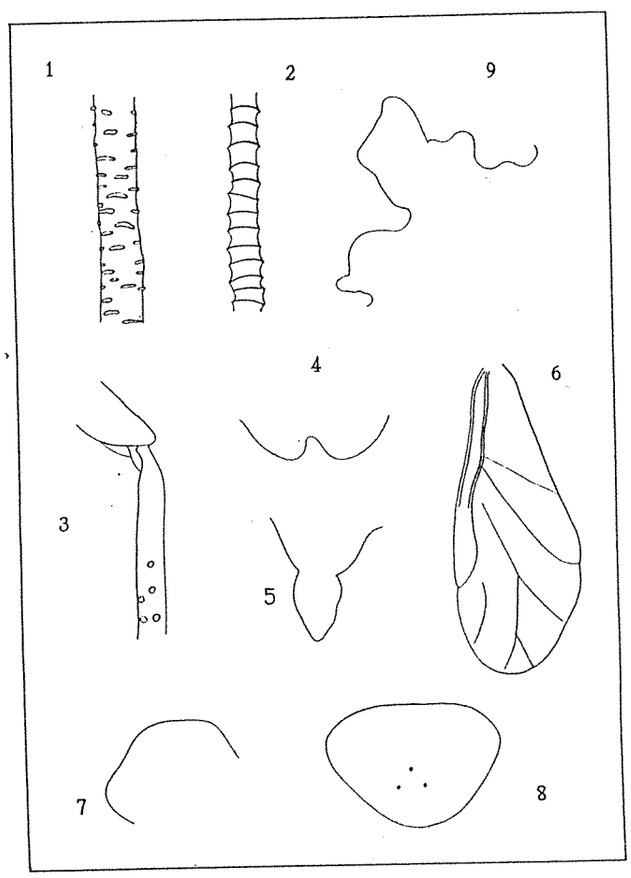

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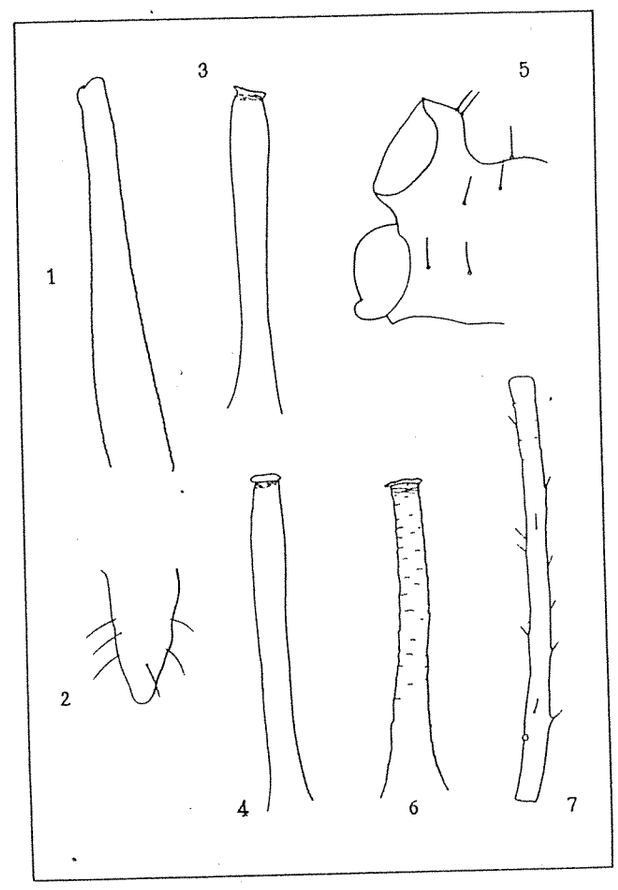

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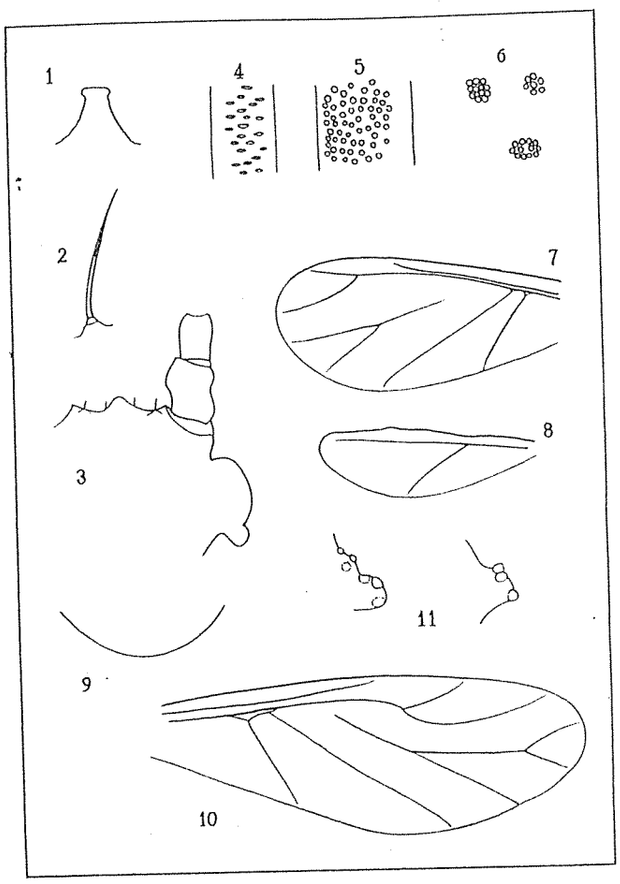

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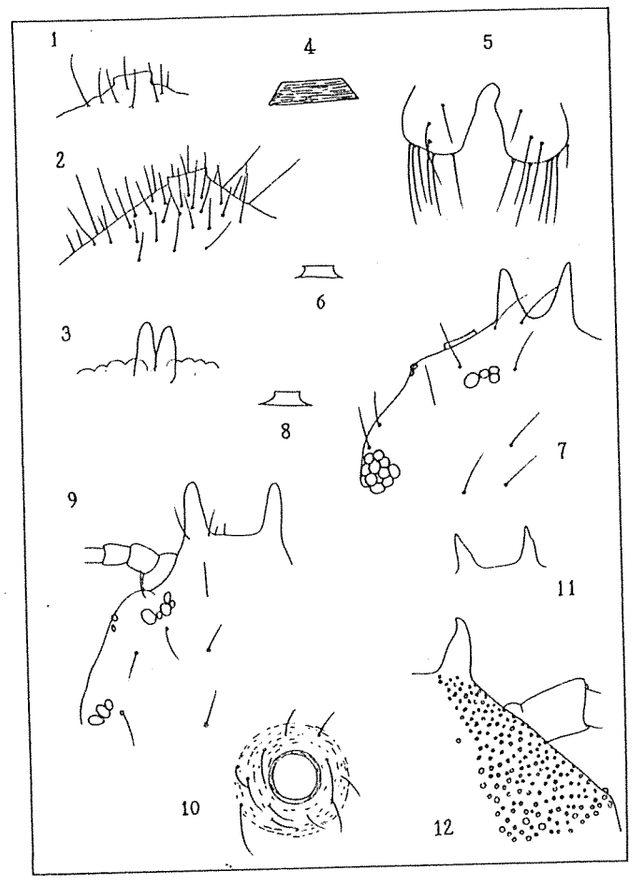

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